DOCUMENT RESUME

ED 470 956 SE 067 002

TITLE	Schoolyard Habitats[R] Site Planning Guide.
INSTITUTION	National Wildlife Federation, Reston, VA.
PUB DATE	2001-00-00
NOTE	98p.; The Schoolyard Habitats[R] Program is supported by the Wege Foundation.
AVAILABLE FROM	National Wildlife Federation, 11100 Wildlife Center Drive, Reston, VA 20190. Web site: http://www.nwf.org.
PUB TYPE	Guides - Classroom - Teacher (052)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS
DESCRIPTORS	Elementary Education; Environmental Education; *Habitats; Interdisciplinary Approach; Outdoor Education; *Plants (Botany); *Science Activities; Science Instruction; *Wildlife
IDENTIFIERS	National Wildlife Federation

ABSTRACT

This document provides guidance for the creation of habitats on school grounds. Science activities, resources, and information on how to apply knowledge to the design, creation, and development of a habitat are presented. Contents include: (1) "Starting the Process"; (2) "Gathering Information: Site Inventory and Analysis"; (3) "Assembling the Elements"; (4) "Ensuring Continued Success"; and (5) "Schoolyard Habitats Resources Guide." The appendix includes Accessibility Guidelines for Schoolyard Habitats, Using a Compass, and Container and Rooftop Gardening. (YDS)

Reproductions supplied by EDRS are the best that can be made
from the original document.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

S. Stowell

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

ED 470 956

National Wildlife Federation

Schoolyard Habitats® Site Planning Guide

BEST COPY AVAILABLE

NATIONAL WILDLIFE FEDERATION®
www.nwf.org™

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Contents

National Wildlife Federation

1 ***Introduction***
- Overview . . . 3
- The Schoolyard Habitats Program . . . 4
- Widening the Classroom Walls . . . 5
- The Community Connection . . . 6
- Schoolyard Habitats vs. Traditional Landscaping . . . 7

2 ***Starting the Process***
- Creating the Habitat Team . . . 8
- The Curriculum Committee . . . 10
- Vision and Goals . . . 12

3 ***Gathering Information: Site Inventory and Analysis***
- Site Inventory . . . 14
  - Activity: Habitat Hunt . . . 17
  - Activity: Wildlife Observation . . . 20
  - Activity: Base Mapping and Inventory . . . 24
- Selecting the Site . . . 34
- Analyzing the Site . . . 34

4 ***Assembling the Elements***
- Schoolyard Habitats Design . . . 37
  - Activity: Dream Habitats . . . 39
- Defining your Schoolyard Habitats Project . . . 43
- Selecting the Materials . . . 43
  - Activity: Habitat Plant Selection . . . 44
  - Plant Selection Chart . . . 46
  - Planning . . . 47
  - Budget Planning Guide . . . 48
  - Activity: Breaking New Ground . . . 49
  - Activity: Planting Your Wildlife Habitat Site . . . 52

5 ***Ensuring Continued Success***
- Maintenance . . . 55
  - Activity: Creating a Field and Care Guide . . . 56
- Integrating Habitats site into Cross-Curricular Learning . . . 58
- Schoolyard Habitats Certification Process . . . 61
- Schoolyard Habitats Application Form . . . 62

6 ***Schoolyard Habitats Resources Guide***
- Printed and Online Materials . . . 66

7 ***Appendices***
- Appendix 1: Accessibility Guidelines for Schoolyard Habitats . . . 88
- Appendix 2: Using a Compass . . . 91
- Appendix 3: Container and Rooftop Gardening . . . 92

Feedback Form . . . 94

Introduction 1

Overview

The National Wildlife Federation® (NWF)'s Schoolyard Habitats® Program, assists schools, teachers, students and community members in the creation and restoration of wildlife habitat and in the use of school grounds as learning sites for wildlife conservation and interdisciplinary learning.

Why should we make this effort to provide homes for songbirds, butterflies and other wildlife with whom we share our communities? Habitat loss is the greatest threat to biodiversity – the grand variety of life forms on Earth. No matter where we are, we can take small actions in our daily lives to make a positive impact on our local environment. At our schools, community centers and learning centers, we have the opportunity, and perhaps an obligation, to put our youth in contact with the natural world. The Schoolyard Habitats Program offers this opportunity while enhancing the quality of education in our schools and communities.

In this guide, students apply their knowledge to the design, creation and development of a wildlife habitat site on their schoolyard or other community space. In the following pages, educators will find information, activities and resources for establishing a habitat-based learning site, including the steps involved in planning, designing and establishing a wildlife habitat project and outdoor classroom.

The Schoolyard Habitats® Program

Habitat Loss in the United States:

- Since the late 18th century, over half of the wetlands in the lower 48 states have been filled in, drained, or otherwise lost.
- California alone has lost 91% of its wetlands.
- Ninety-five percent of old-growth forests – which tend to support the greatest biological diversity among forests – have disappeared.
- Waving grasslands up to eight feet in height once covered Iowa, most of Illinois, and a broad band through Texas. Today less than 1% of this native tallgrass prairie remains.

BEST COPY AVAILABLE

The Schoolyard Habitats® Program

Schoolyard Habitats sites meet the needs of wildlife by providing the four critical habitat components: food, water, cover, and places to raise young. These projects offer many benefits to students and educators including: enhanced hands-on learning opportunities, on-site "field trips," decreased grounds maintenance costs, development of stronger ties within the community and a sense of empowerment and environmental stewardship in students both in their own neighborhoods and beyond. Schoolyard Habitats sites offer unlimited opportunities for active cross-curricular learning and provide a creative tool with which educators can meet state and national standards of learning.

The size and scale of Schoolyard Habitats projects vary greatly. Some schools turn a small corner of asphalt playground into a wildlife haven with raised bed gardens and bird feeders. Others transform the entire school grounds into a home for native plants and local and migratory wildlife.

As the public becomes increasingly aware of the importance of conserving habitat to protect wildlife, and as educators seek to provide hands-on learning opportunities for their students, interest in creating habitat sites has increased. Thousands of school communities have made use of Schoolyard Habitats Program materials, participated in our professional development workshops, and initiated Schoolyard Habitats projects with NWF support. As part of the program, NWF recognizes the ongoing efforts of schools – in urban, suburban and rural areas – through a national certification process.

For the students involved, creating and maintaining a habitat project provides a dynamic, relevant, real-world learning experience. Creating or restoring a habitat not only gives students a hands-on opportunity to learn about wildlife, but also empowers them to create positive change and take an active role in their school, neighborhood and community. Working on a Schoolyard Habitats project allows students to discover how they can make a difference. Reinforcing these lessons with awareness activities and continued project upkeep develops students' sense of stewardship for the natural world. This combination of new awareness and involvement in a successful, tangible action project fosters a lifelong interest and involvement in local and global environmental issues.

Widening the Classroom Walls

The traditional indoor classroom works well for many students and many types of lessons. However, for learning about the natural world, providing a dynamic context for learning about all subjects, and for meeting the needs of children with different learning styles, the indoor classroom may prove limited. Schoolyard Habitats sites are often thought of as outdoor classrooms: living laboratories where learning can be extended or skills can be applied. An outdoor classroom provides educators and students with the opportunity to draw upon each of their five senses as they explore the world around them. Schoolyard Habitats sites can become a regular destination for on-site field trips for students of all ages and abilities.

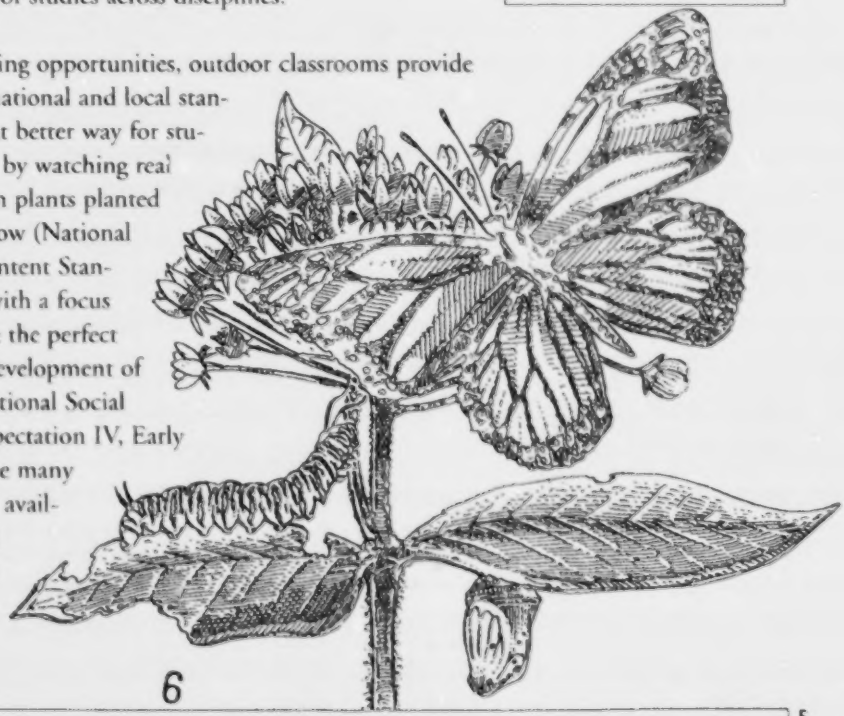
In the outdoor classroom, students find motivation for learning that may be re-visited with new enthusiasm in the traditional classroom. Children's natural curiosity will be sparked by the concrete, personal investigations possible in their own living laboratory. To help make the invaluable opportunities of the outdoor classroom accessible to all students, we have included guidelines for adapting activities and site designs to students with disabilities.

In the past, observing nature and participating in activities in the outdoors were often considered opportunities only for teaching science and natural history. Today, outdoor classrooms are used both as a means to deepen teaching within all subject areas (math, language arts, geography and art, to name a few), as well as a way to provide context for studies across disciplines.

In addition to cross-curricular learning opportunities, outdoor classrooms provide unique and effective ways to meet national and local standards of learning. For example, what better way for students to learn about life cycles than by watching real butterfly larvae emerge from eggs on plants planted by students in their very own meadow (National Science Standards, Life Science, Content Standard C, K-4)? Schoolyard lessons, with a focus on local plants and wildlife, provide the perfect backdrop for student writing and development of personal connections to a place (National Social Science Standards, Performance Expectation IV, Early Grades). Taking inspiration from the many excellent professional curricula now available, educators embrace Schoolyard Habitats sites as effective tools with which to meet high academic standards.

The Benefits of Field Trips to an On-site Schoolyard Habitats Project

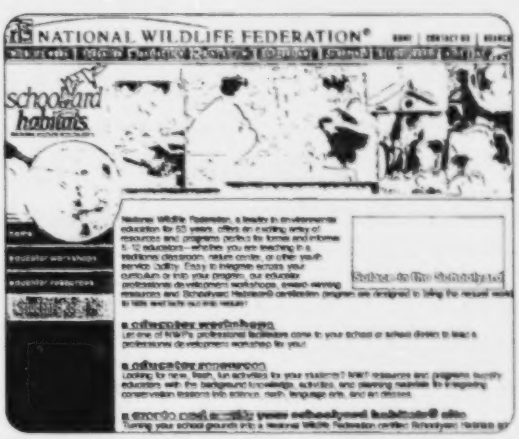
- *Immediate accessibility*
- *Maximized teaching time*
- *Minimized liability concerns*
- *Cost savings*
- *Continuous availability*
- *Reduced need for additional supervision*
- *Abstract lessons come to life*



The Community Connection

The benefits of Schoolyard Habitats projects are many and varied, but to be successful, community involvement and support is essential. Involvement by local resource professionals will add invaluable expertise and creativity to the project. To build greater support for the habitat creation, explain to the school community the ways in which the habitat site will enrich all students' education. Highlight the ways that a Schoolyard Habitats site will benefit the entire community, by creating a neighborhood jewel, a new source of pride and spirit, and potentially, a public place for all to visit and enjoy nature's wonders.

NWF provides educators with access to many resources that will aid in gathering community support. NWF's inspirational Schoolyard Habitats video can be used to attract attention and support of parents and community members. Our on-line, state-by-state listing of certified schools can help connect interested educators with nearby schools that have already successfully certified a Schoolyard Habitats site. Inviting a teacher or principal from a school with a thriving Schoolyard Habitats program is a great motivational tool for educators, students and administrators. NWF also offers a range of high quality professional development opportunities. In addition, the Schoolyard Habitats Website www.nwf.org/schoolyardhabitats/ includes articles about how Schoolyard Habitats sites work as powerful teaching and learning tools – for students and the community at large – which can be used to illustrate the potential benefits of the program to administrators and potential donors.



As with many community projects, the more people committed and involved in a Schoolyard Habitats project, the stronger the final product will be. A wide support base is critical to ensuring the continuity of the project over the

www.nwf.org/schoolyardhabitats/

long-term. Educators will find that the creation of a habitat-based learning site requires a team of people (students, educators, community members) with diverse interests, skills and experience. Many schools have had great success with involving the local community in their project. Parents not able to volunteer during school hours enjoy adding their time to a weekend planting day, while businesses enjoy the tangible results of their contributions. A small amount of effort directed toward the conservation of wildlife habitat on school grounds or other community areas produces positive outcomes for wildlife and people. Development of a Schoolyard Habitats project fosters a sense of ecological awareness, stewardship, empowerment and "big picture" thinking among students, teachers, administrators and community participants alike.

Schoolyard Habitats vs. Traditional Landscaping

Traditionally, school landscapes are developed without much thought to regional climate or to native wildlife and plants adapted to that region. Across the country, turf grass and pavement are the most common covers on schoolyards and community use areas. Yet, with careful planning and planting of a Schoolyard Habitats site, urban, suburban and rural schools can create a lower maintenance habitat that invites and supports local wildlife and learning.

Large-scale schoolyard transformations are often achieved through environmentally sound landscaping choices. From a cost-savings standpoint, these choices will result in reduced landscape maintenance and energy expenditures. **Read on to learn how to turn the schoolyard into a habitat for wildlife.**

Environmentally Sound Landscape Choices

- *Grow native plants*
- *Reduce turf areas*
- *Eliminate pesticide use*
- *Reduce fertilizer use*
- *Reduce water consumption*

BEST COPY AVAILABLE

Assembling the Habitat Team

Creating a habitat site requires the dedication and work of many people. Establishing a team is essential: having a core group of committed leaders will ensure the long-term sustainability and growth of the project. Assembling a Habitat Team is the first step toward getting others involved and committed to the project. The Habitat Team acts as the driving force behind the development and continuity of a Schoolyard Habitats project. The team must lead the planning, fundraising, publicizing, building and planting of the habitat-based learning site. The diverse skills and support each member of the Habitat Team brings to the project will be crucial to the habitat's overall conception, construction and maintenance. For a solid foundation, the Habitat Team should include representatives from each of the following school community groups: students, educators, administrators, maintenance staff, parents, local businesses, resource professionals and curriculum developers. A worksheet follows (page 11), to assist in your planning process.

Students

Student leadership and initiative are essential to a successful habitat project. From the beginning, the components, structure and goals of the Schoolyard Habitats project should be defined by student input and ideas. Students serve as a tremendous source of enthusiasm and creativity for habitat projects. Involving students throughout the process will maximize the educational potential of the project, and help students develop a strong sense of ownership and empowerment.

Educators

There should be at least two educators on the habitat team. Their consistent, direct work with students enables educators to help guide students in the planning and creation of the habitat. Educators should work to strike a balance between pushing the project forward and stepping back to allow student initiative. Throughout this process, educators may serve as mentors and facilitators, providing both inspiration and guidance for students. Educators also play a critical role in gathering support from the school faculty, and helping colleagues seize the educational opportunities presented by the project.

Administration

Support and participation of school officials is crucial. Administrators can offer insight into budget concerns, future building plans, liability issues, community relations and funding opportunities. School officials react favorably to projects such as these that improve the school's image, offer cost savings, provide teaching oppor-

tunities across the curriculum and incorporate student leadership and enthusiasm for the project. Administrators are often eager to support a Schoolyard Habitats project once they realize the connection between the school's curriculum requirements and the educational opportunities of a Schoolyard Habitats site.

Where to Look – Community Resources

- *Cooperative Extension Service*
- *School PTA/PTO*
- *School Board of Education*
- *Federal and local resource management agencies (i.e.: Soil and Water Conservation District, U.S. Forest Service, U.S. Fish and Wildlife Service, federal or state Environmental Protection Agency, NRCS, etc.)*
- *Conservation and environmental groups*
- *Colleges and universities*
- *Garden clubs*
- *Corporate grantors and private foundations*
- *Businesses (i.e. local home and garden centers, nurseries, etc.)*
- *Civic organizations*
- *Boy Scouts/Girl Scouts*
- *Native Plant Society*
- *Local Master Gardeners*
- *Religious groups*
- *Neighboring businesses and/or homeowners*
- *Community members with NWF certified Backyard Habitats*
- *Students and teachers from certified SYH schools*
- *Colleges and Universities*
- *Local landscape designers*
- *Nature Centers*

Maintenance Staff

Invite maintenance staff members to provide input into the process. They possess valuable knowledge about the school grounds and possible equipment available for project construction and maintenance. Convey to the maintenance staff the purpose and scope of the project, and the important role they play and critical skills they bring to its long term success. Early in the process, explain what will and won't be expected of the maintenance staff in terms of the habitat site. Generally, students and volunteers, not the maintenance staff, maintain Schoolyard Habitats sites.

Parents and Guardians

Parents and guardians enthusiastically support projects that excite, educate and stimulate their children. Ask them to volunteer to help with the process. For those unable to volunteer during school hours, set up after school or weekend volunteer times. Many parents have found their own lives enriched through involvement in a Schoolyard Habitats project. Their enthusiasm and resources – personal and professional – are valuable assets in the life of the project. The participation of parents and student family members is crucial to expanding the support and impact of the program beyond the school.

Local Businesses and Civic Organizations

In many successful Schoolyard Habitats projects, community partners offer technical support, material contributions, small grants, volunteers and other in-kind donations to habitat projects. As a result, these groups gain positive recognition in the community and, in turn, strengthen their customer or member base. Involvement by local businesses and organizations also serves to strengthen school-community relationships. Always acknowledge contributions to a Schoolyard Habitats project with letters of appreciation, and publicize the assistance given by local businesses.

Resource Professionals

Resource professionals offer invaluable knowledge and skills to

BEST COPY AVAILABLE

Schoolyard Habitats projects. Remember, because this is a local project, focus the search for "experts" locally. They bring expertise to the planning and development of specific habitat components, while also serving as positive role models and mentors for students.

Through workshops and school assemblies, their involvement with the project may open the eyes of students and others in the school community to new career directions and possibilities.

***Remember:** An essential goal of the Schoolyard Habitats project is to reflect ideas brought forth by the students, while attempting to incorporate those of the larger school community. Student involvement and leadership are vital to the habitat's success!*

Resource Professionals

- *Forester*
- *Cooperative Extension agent*
- *Park naturalist*
- *Wastewater engineer*
- *Wildlife biologist*
- *Land-use planner*
- *Horticulturist*
- *Landscape architect*
- *Local historian*

Curriculum Committee

Although the planning and creation of the Schoolyard Habitats site may take several months, it is important to consider curriculum connections and educational uses of the habitat site from the very beginning. A **Curriculum Committee** therefore is an essential sub-group of the Habitat Team. In some Schoolyard Habitats sites, the Curriculum Committee is comprised of 3 or 4 teachers who meet on their own, but keep in close contact with other members of the Habitat Team. At other schools, faculty who already meet regularly to discuss curriculum (i.e. by grade-levels) set aside a portion of their planning time to discuss Schoolyard Habitats connections.

Once a habitat site is created, incorporating the site into instruction often becomes the responsibility of individual teachers. For all to benefit from the Schoolyard Habitats site's potential, it is important for the entire Habitat Team to keep all faculty informed during the planning and building stages. In a faculty bulletin, share with other educators the project rationale, project goals, status of the site and curricular possibilities under exploration. The more educators "on board" during the planning process, the more the completed Schoolyard Habitats site will be used, and the greater the numbers of students who will reap its educational rewards.

BEST COPY AVAILABLE

Team Planning Sheet

Schoolyard Habitats

School: _____

Team members for the _____ school year:

	Role
Students:	
1.	
2.	
3.	
Educators: *example: Ms. Stowell, 4th Gr. teacher*	*curriculum coordinator*
1.	
2.	
3.	
Administrators:	
1.	
2.	
Maintenance Staff:	
1.	
2.	
Parents/Guardians: *example: Ms. Cooper*	*fundraising from local businesses*
1.	
2.	
3.	
Local businesses or organizations:	
1.	
2.	
3.	
Resource Professionals:	
1.	
2.	

Examples of roles to be filled: team leader, budget/fund-raising, curriculum coordinator, historian, maintenance, parent/volunteer coordinator, parish/district liaison, publicity, student liaison.

© Copyright 2001 National Wildlife Federation

Develop Your Vision

Creating a Vision Statement

Before setting your specific goals, take some time to develop a vision for your Schoolyard Habitats site that everyone can agree on. The process of developing this vision will aid in bringing together the community and generating enthusiasm and ownership for the project. Be sure to have everyone involved – from the students to teachers or leaders, administrators and community members. Work through the "Vision Worksheet" on page 13 and then have people respond to each other's differing visions in a large meeting, in an on-line forum, or in smaller groups. If possible, devote all or part of a PTA meeting and/or faculty meeting to filling out and discussing both the Vision Worksheet and the Goals worksheet, and to sharing student ideas with the audience. (Teachers should focus on gathering student input by working with as many students as possible on these sheets). You may want to use the Dream Habitats activity (p. 39) before your site inventory as part of this visioning process.

Setting the Goals

The next task of the Habitat Team is to define and set clear and attainable project goals. Long-term goals are essential. However, be sure to set short-term goals that are readily accomplished, to keep motivation high. The ongoing nature of these projects allows for additional time to locate funding and materials.

Sample Vision Statement: *"Our vision for a Schoolyard Habitats project is to provide a natural area that is aesthetically pleasing where wildlife can be observed and appreciated. This site will provide students with hands-on experiences that enhance all areas of the curriculum."*

Examples of Specific Goals:

- ◆ *Dig up/dispose of asphalt on site*
- ◆ *Plant 7 native trees/shrubs*
- ◆ *Create 10' by 12' butterfly garden*
- ◆ *Put in 3 raised flower beds*
- ◆ *Identify learning standards that can be met in the Schoolyard Habitats site*

BEST COPY AVAILABLE

Vision worksheet

School:

Name:

Describe how your schoolyard currently looks:

What kinds of activities normally take place there?

If you could change your schoolyard in ONE way, what would it be?

If you could change your schoolyard in any and all ways, how would it look?

What would happen there? Who/what would use it?

Where will your Schoolyard Habitats site be located?

What size will it be?

Goals Worksheet

Target completion date

Long-term Goal for Our Schoolyard Habitats project:

Short Term Goals:	Projected Completion Date
1.	
2.	
3.	
4.	
5.	

BEST COPY AVAILABLE

© Copyright 2001 National Wildlife Federation

3 Gathering Information

Site Inventory and Choosing Your Site

A site inventory is an important educational step in the development of a Schoolyard Habitats site. This may be the first time the Habitat Team members and students step outside with a critical eye to assess the school grounds for its potential as an outdoor classroom and wildlife habitat. Before any decisions can be made about where or what will be planted on the Schoolyard Habitats site, everyone should have a thorough understanding of the different characteristics of the land on which they will work. The process of analyzing and creating an inventory of the site is a valuable teaching exercise for the entire Habitat Team and students of all ages. The inventory utilizes measuring and math skills, drawing, mapping, and observation skills. This experience can be an individual's first introduction to the ecology of the schoolyard. The following set of activities will guide you and your students through this process: Habitat Hunt, page 17; Wildlife Observation, page 20; Base Mapping, page 24; Dream Habitats, page 39; Plant Selection, page 44; Breaking New Ground, page 49; Planting Your Wildlife Habitat site, page 52; Creating a Field and Care Guide, page 56.

In this first phase of the project, team members and students go outdoors to familiarize themselves with the schoolyard. The subsequent mapping activities will help students create a "big picture" of all the observations and data collected during the site inventory. These activities will be helpful in creating a connection between students and the site, and will also provide invaluable information for use in the planning process.

Conducting a thorough site analysis requires spending a good deal of time out on the site. During this process, the Habitat Team and students learn what occurs on the site in a day, and think about changes that may occur in the evenings or over the change of seasons. Each person will have a unique view of the site or an experience to contribute.

The site inventory should be as comprehensive as possible, looking at the physical elements of the site (such as soil type, topography, drainage patterns, pedestrian traffic) and ecological components (plants and animals already on the site). In addition to the natural characteristics of the site, it is important to note all human-designed components of the site, including buildings and asphalt areas.

Your site inventory should not stop at the edge of school property. Look beyond the school grounds to assess the neighboring areas. Who shares a common boundary with the site? If a city park exists next door, perhaps the habitat project can support existing wildlife habitat in the park. Or maybe neighbors would be interested in creating and connecting habitat corridors to backyards or woodlands.

In addition to the physical and ecological inventory, it is important to research the history of the school site. How was the land used before the school or other buildings were built? What kind of natural ecosystem was found on the school property? A historical inventory can be fascinating and is another great tool for involving the community. Have students interview long-time community residents and conduct other research with local historians, naturalists and others.

Creating a wildlife habitat area begins by understanding the proposed site and how the different elements of that site relate to each other and local wildlife. To fully understand this, the site must be closely examined, one component at a time. It is not necessary to be an expert or professional landscape designer to map and observe your habitat site. It is more important to create a connection between team members, students, and the site through the inventory process than it is to have a professional site design. This connection will result in an increased sense of ownership and stewardship for the project by those involved.

Site Inventory Elements

Elements of the site inventory include but are not limited to:

Traffic Patterns

- Study foot, auto and bicycle traffic on your site.
- Make note of all existing pathways (formal and informal). Check for signs of wildlife trails.

Water Flow / Topography

- Observe contours and slopes of the site. Note where water flows during times of rain and of areas where water drains or settles.

Existing Vegetation

- Make note of existing vegetation such as deciduous trees, evergreen trees, shrubs, long vs. short grass, natural vs. landscaped areas. Depending on ages of students, this step may include identification of specific species of plants.

Permanent Structures

- Take note of buildings (take into consideration location of doors and windows. Can you situate your habitat site so that it can be seen from class rooms? Is the site easily accessible for all students?)
- Record the location of sidewalks, driveways, parking lots, and loading areas.
- Look for other human influences (i.e. playing fields, utility lines and towers).
- Make note of underground utilities or power lines.
- Make note of water sources (both natural and municipal).

Signs of Wildlife

- Observe wildlife visiting your schoolyard, include actual sightings, tracks, scat and other signs of wildlife activity.

Soil Types

- Take soil samples from different areas of your site and compare color, texture and moisture content. Hint: Recruit a garden shop representative or an employee of the local soil and water conservation district to help with this part of the activity if no one in the group is familiar with soil pH and composition.

Sun and Shade

- Study which areas of the site receive the most sun and the most shade. How much does air temperature change throughout a day? Throughout the year?

Adjacent and Historical Land Use

- Consider how nearby neighbors utilize their land. Make note of any existing green spaces or large paved areas, for example.

- Investigate past land use and site history.

As you go through the activities that follow, you may wish to create a class or group Schoolyard Habitats portfolio – either individually to use as an assessment tool, in small groups, or as a whole group. Each additional piece of information will be added to the portfolios, so that there will be a growing body of knowledge from which to draw in planning your site. See pages 24-33 for step-by-step instructions for the inventory process.

The activity on the next page allows students to explore their schoolyard, to learn about the basic wildlife habitat requirements, and to assess the schoolyard as a wildlife habitat.

Activity
Habitat Hunt

Summary

Students assess the schoolyard (or nearby park) as a habitat for local wildlife.

Grade Level: *K-8*

Time: *2 class periods (60 minutes)*

Subjects: *Science, Geography*

Skills: *Observation, description, analysis, research*

Learning Objectives:
Students will be able to:

- *Locate habitat elements on the schoolyard*
- *Assess schoolyard's potential as a suitable habitat for a specific animal*
- *Identify an area of the schoolyard that would include the most habitat elements for a specific animal*

Materials:

- *Pictures of local wildlife*
- *Construction paper or flagging tape (4 colors)*
- *String (and/or masking tape)*
- *Single-hole punch*
- *4 colors of chalk or dry-erase markers*
- *Scissors*
- *Journal*
- *Pencil*
- *Tools for observing wildlife: field guides, binoculars, hand lenses (optional)*
- *Habitat Hunt worksheet (page 19)*

Background

In order for an animal to survive as a species, it must be able to find adequate habitat that provides food, water, cover, and a safe place to raise its young. The amount and quality of these needs vary a great deal from species to species. It may be that your schoolyard already has adequate habitat for some animals – students may have seen squirrels romping around in nearby trees, or have heard songbirds in the spring. This activity may answer questions as to what these animals are finding in your schoolyard, and what they and other species may lack.

Identifying and locating the elements already present on school grounds represents the first step in restoring wildlife habitat. From there, you will better understand ways to attract and help support a wider variety of local wildlife.

Preparation

Cut construction paper into "flags" (a rectangle quarter of a page) and punch a single hole in the top, or set out materials for students to do this during class time. Alternatively, provide 4 colors of flagging tape. Each student, should have 4 flags, one of each color. Designate one color for food, one for water, one for cover, and one for places to raise young. If necessary, have students label each of the flags.

Procedure

1. Review the four basic elements of habitat and the importance of each for animal survival.

2. Pass out the Habitat Hunt worksheet on page 19. Tell students they will complete these during an exploration of the school grounds. (If the area to explore will be limited to certain sections of the school grounds, state the boundaries of the area). They will look at the school grounds as if they were a local animal species in search of habitat.

3. Have students choose a local animal species common to the area. Using field guides or storybooks (K-3), identify the types of food, water cover and places to raise young that their animal requires.

4. Pass out construction paper flags so each student has one flag of each color. Tell students they will use the flags to tag the area where a habitat element for their animal is located on the school grounds. One color represents food, one represents water, one cover and the other places to raise young. Have the student write the name of their species on each flag so they will be able to tell them apart from those of other students. Have them cut string and punch a hole in each flag (if not already done) so they can tie flags outside.

5. While students are outside, they will need to think about the following:

- In order to survive, all animals need food, water, cover and a safe place to raise their young.
- When outside, take a look around you. Do you see the necessary habitat elements for the animal you have chosen to survive here? Spend some time exploring this area. Look for all the characteristics of habitat that meet your specific needs. Based on what you find, you will decide to stay and call this area "home" or continue to look for a new place to call home.
- Describe the four elements of habitat you found that meet your needs:
  ✔ Food ✔ Water
  ✔ Cover ✔ Places to Raise Young
- Note where you found each element. Are they spaced close together or spread out over the school grounds?
- Decide whether you (as the animal) would stay and set up home here. Why or why not? What other habitat elements would need to be added for you to stay here?

6. Before going outside, review any safety rules with the class. If the area is too large, consider setting up boundaries for the activity. Depending on the age range, have students stay together as a group, or allow them to investigate the school grounds on their own. They are searching for a new habitat for their animal, but first they must identify which of the four basic habitat elements are on school grounds. As they explore the schoolyard in the role of the animal, students will use the different colored flags to identify as many habitat elements as they can find for their animal. These may vary for different animals and not all the students are likely to locate all four elements for their animals.

7. After they place each flag, participants will use the Habitat Hunt worksheets and/or student journals to record what and where they found all or some of what they need to survive. While outside, be sure to help students if they feel unable to identify the elements.

8. Once all students are finished, tour the schoolyard together and collect the flags. Discuss the habitat elements each flag signals. After the exploration, have the class assess its findings. If possible, use chalkboard (a dry-erase board or overhead and transparency will work as well) to draw a simple map of the area explored during the activity. Have each child come to the board and add the location of the elements they flagged to the map. Each element should be represented by a different color of chalk (or marker). As a class, discuss the map. Which areas on the school yard have the most habitat elements? How many different species might each section support? Ask each student to decide if the schoolyard would be part or all of their animal's habitat. What habitat elements may need to be added to enhance or create adequate wildlife habitat?

For older children: Have participants put the information they discover directly onto maps, rather than using flags.

Extensions

Challenge students to think about how the availability of certain habitat elements may change through the seasons. Would water be more difficult to get for wildlife in summer or winter? Are small streams, ponds and puddles they may have seen available for wildlife all the time? What about food?

Assessment

Have students write a short essay describing their findings in the schoolyard and how the area meets and does not meet their animal's needs. How would the schoolyard need to change to become a better habitat? You may want to instruct younger students (K-3) to draw pictures of their animals habitat needs.

Worksheet

Habitat Hunt

Directions:

You are a _____ In order to survive you need Food, Water, Cover, and Places to Raise Your Young. Explore the schoolyard. Describe the habitat elements you find and where you find them. Then, decide whether or not you could stay and make your home here.

Food Source:

Water Source

Cover:

Places to Raise Young:

Questions:

1. Will you stay and make your home here?

2. Why or why not?

3. What other habitat elements would you like to see here?

© Copyright 2001 National Wildlife Federation

Activity 5
Wildlife Observation

National Wildlife Federation

Summary

Students hone their observation skills and gain a sense of what wildlife is already utilizing their schoolyard.

Grade level: *3-8*

Time:
1 class period

Subjects:
Science, writing

Skills: *Observation, description*

Learning Objectives:
Students will be able to:
- *Identify wildlife currently using their schoolyard*
- *Describe several ways in which observed animals (or those who left signs) are using the schoolyard*
- *Make careful observations*

Materials:
- *Binoculars and hand lenses if available*
- *Clipboards*
- *Animal Observation work sheet, Wildlife Clues sheet, p22-23*
- *Pencils*

Background

Students might be interested to know what wildlife already uses (or does not use) the schoolyard.

Additionally, this activity gives students the chance to hone their observation skills.

As a teacher, you will want to familiarize yourself with some of the local wildlife that students are likely to observe. Take some time before this activity to walk around the school grounds and see what you can find.

Procedures

1. Ask students what animals they think the animal they "became" in the previous activity is already present in the schoolyard. Why or why not?

2. Explain to students that they will now spend some time observing their schoolyard to determine what wildlife, if any, is currently using it as part or all of its habitat.

3. Hand out the Wildlife Clues sheet and the Observation Sheet, page 22-23, along with clipboards, pencils, binoculars (optional), and hand lenses if available. Take a few moments to go over the wildlife clues sheet. Ask if students have seen any of these clues before; show examples if you have any available. Ask if there are any questions, or if students can think of additional clues that they can add to the bottom of the sheet.

4. Tell students that they will need to be very quiet to observe wildlife, especially if they want to see sensitive animals like many birds. Sudden noises and movements might scare animals away. Once outside, each student will pick one place to sit, at least 5 yards away from any other student. If needed, assign each student to a specific place. They should pick a comfortable position – sitting, lying on the grass, or even standing if they prefer. They will stay there for 5-20 minutes depending on the age of the students, and record every animal they see or hear, either on the ground, trees, in water if available, or in the air. If they know the names of animals they see, they should record them, but if not, they can draw a quick sketch and identify them later. They could also use words to represent the sounds that they hear. Remind students to look not only for big animals that are easy to see, but also for little ones on the ground, like insects. Also remind them to listen carefully as well as look. Binoculars and hand lenses will help observations.

5. After the quiet period, tell students that they will now remain silent but walk slowly around the area looking for wildlife clues and recording all they find without talking to each other. Students may be able to hear a bird call (even if they can't see the bird), find animal homes (e.g., bird nests, insect galls, ant hills, underground burrows), or find other clues such as animal tracks, animal scat, nibbled leaves or broken spider webs. Give students 15 minutes to do this.

6. When the time is over, reconvene students in the classroom to exchange information. What did they see? Where was wildlife observed? Did students observe the animal they were role-playing in the previous activity? What kinds of clues did they find? What was missing that they would have liked to see? How did they feel while making observations? If no wildlife was observed, why do they think this was so? What can they do to attract more wildlife in the future? Record all this information on a large flip chart.

Extension

If possible, arrange to have students repeat this exercise at different periods of the day – either very early in the morning, or at dusk. See if they can discover any differences.

Assessment

Have students create a chart showing each animal they observed or sounds of wildlife they found, and the ways it could meet its habitat needs in the schoolyard or nearby areas.

Worksheet

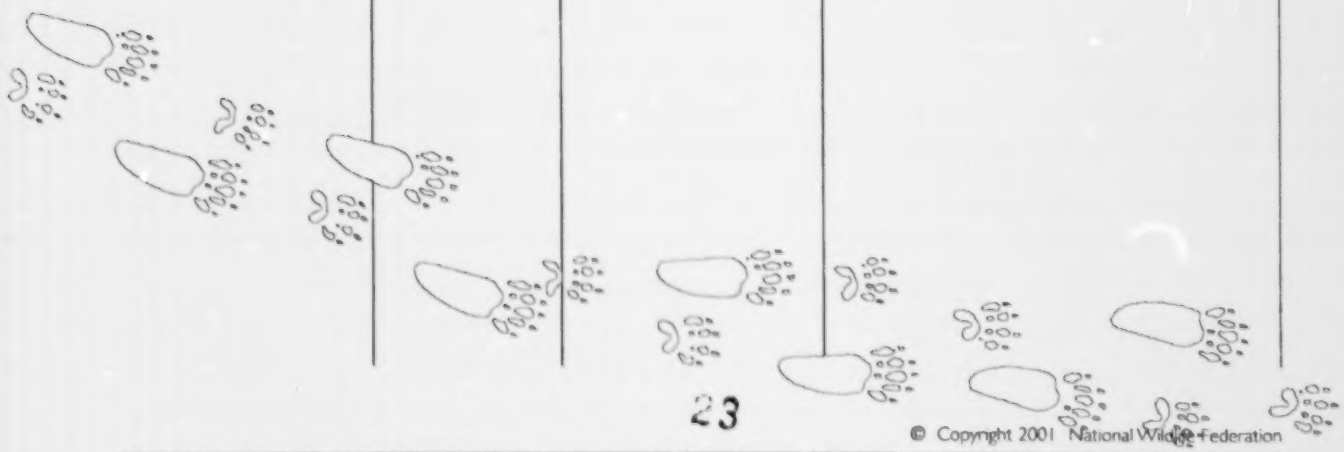
Animal Observation

National Wildlife Federation

Your location: _____

Time of day: _____

Animal Observed	Location	Activity	Sketch

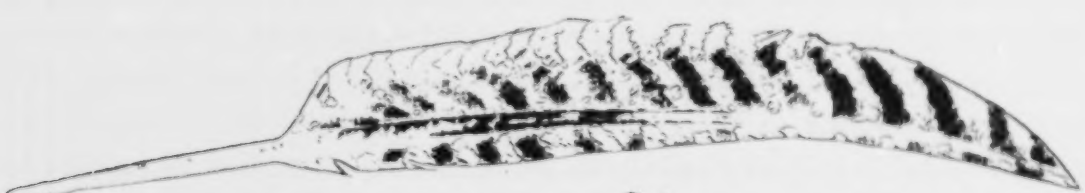


© Copyright 2001 National Wildlife Federation

Wildlife Clues

Often animals are hard to spot during the day, particularly in areas near a lot of people. When you look closely, however, you will find signs that animals have been nearby. Below is a list of some wildlife clues to look for - see if you can find these and other wildlife signs as you explore.

- ✔ Green leaves with irregular edges are a clue that some one's been eating that leaf – it could be an insect or a deer.
- ✔ Hairs caught on a fence suggests that a fox, sheep, rabbit or other mammal might live close by.
- ✔ A trail that leads nowhere (or under fallen logs and through bushes) might be a path made by a number of different animals such as a deer or rabbit.
- ✔ Pieces of moth or butterfly wings show that a bat, bird, or spider has been eating.
- ✔ Gnawed or stripped bark on a tree could be the calling card of rabbits, squirrels, deer or even some wood-eating insects. Bark carved with initials suggests a different suspect – a human.
- ✔ A flattened circle of grass or leaves is the clue left by an animal lying down.
- ✔ See feathers on the ground? They are probably from a bird that either stopped by, or was eaten there.
- ✔ A dug-out area in the base of a tree might be a fox den.
- ✔ Medium-sized holes in the ground might mean a rabbit's burrow. Rabbits also make grass nests along sandy banks, under bushes or in fields. Look for rabbit pellets (feces) and fur near the holes.
- ✔ Leaves and twigs make up a squirrel's nest on tree branches or in tree holes.
- ✔ A tree with a hole bored in it is a clue that a woodpecker is active nearby.
- ✔ A tree hole that's partially filled in with dry mud could be a nuthatch nest.
- ✔ A spider web (whole or broken) is a spider's trap to catch food.
- ✔ A small mound with a hole on the top is a sign of an ant hill
- ✔ Twigs and branches carefully put together in a nest is the work of a bird. To find bird nests, participants should look high and low, in shrubs, grasses and in trees. Building ledges, eaves of houses, telephone poles and other man-made structures also provide good spots for nests.
- ✔ A gall (a strange outgrowth on a tree that looks as if a baseball or other object was stuck under the bark) may mean that insects are inside.
- ✔ A hive may be buzzing with bees.
- ✔ Animal tracks (use a field guide to help you identify) show an animal's trail.
- ✔ Small holes in ground may be home to moles or other burrowing mammals. Larger holes may be the work of a groundhog.
- ✔ Gnawed fruit stones and seeds mean a mouse, vole, squirrel or other gnawing rodent is probably near.
- ✔ Egg masses left on leaves indicate an insect.
- ✔ Sounds of bird song or insects buzzing tell you these animals are very close.
- ✔ Mounds of dirt suggest there are tunnels below surface, a mole or chipmunk, perhaps.



Activity

Base Mapping & Schoolyard Inventory

National Wildlife Federation

Summary

Students create a base map of the schoolyard, then conduct a site inventory of the grounds, mapping the physical and human elements. Students then assess the schoolyard for its habitat potential and identify a site for a Schoolyard Habitats project.

Grade level: 5-8; K-4

Time: *3-7 class periods (depending on size of class, team structure, and size of area to be mapped)*

Subjects Science: *Math, Geography, Art, Science*

Skills: Research, analysis, observation, description

Learning Objectives:
Students will be able to:
- *Identify existing natural and artificial characteristics of available land*
- *Create a basic map of the area*
- *Select an appropriate site for the creation of a habitat area within the land available*

Materials:
- *Field guides*
- *Paper and pencils*
- *Clipboards (if available)*
- *Compasses*
- *A large poster or interactive creation to show different parts of compass*
- *Sample site maps or drawings*
- *Worksheets, pp 27-33*
- *Overhead projector and transparencies, - OR - Graph paper, poster board or butcher paper (see note at end of activity if a projector is not available)*
- *Different colored overhead transparency markers, - OR – crayons, and/or colored pencils*
- *Rulers and markers*
- *Journals*
- *Thermometers*

For younger participants:
(see note at end of activity)
- *Field guides with large color pictures*
- *Butcher paper or cardboard*
- *Colored clay, construction paper, and/or building blocks*
- *Odds and ends to represent different parts of site*
- *Scissors, glue*

Procedure

1. Go out on the school grounds or site at various times during the day. Have students consider the following questions and make notes in their journals. If they do not yet have journals, they should create simple ones.

- How do you feel when you are at the site? Comfortable? Exposed?
- Where is your favorite place? Why?
- Where is your least favorite place? Why?
- Where are the best views?
- Where is the quietest spot? The noisiest spot?

2. Tell participants that they will all help to create a base map of their school grounds or site. This map will include many different features of the site. Explain the following process: Students will begin by creating a very simple map together, and will learn how to orient themselves using this map and a compass. The next part can be done in a number of different ways. Depending on the size and level of your group, and time available, you may wish to have all your students do each activity, perhaps one each class period. Alternatively, you may wish to divide your students into small teams, each charged with investigating and mapping a different feature. When all groups have finished conducting their research, they will assemble everything together to create one very detailed map. Show sample maps or drawings to illustrate each feature that a team will map.

3. Construct an outline map of the site as a group. The students can help create this map, but you should make sure that it accurately reflects what the site looks like. The outline map should be a fairly simple sketch of the area (see samples on following pages). Identify an appropriate scale. The map should include all borders, such as property lines, sidewalks, roads, etc., and any large permanent features such as buildings (showing exits and entrances), fences, power lines and ball fields. The outline map can be drawn on a transparency and shown on an overhead projector (if an overhead projector is not available, or if the majority of students are 4th grade or below, see notes at end of this activity).

4. If the outline map is on a transparency, create one copy per group on white or solid colored paper and place them each on a separate clipboard. Put an overhead transparency on top of the outline map. Students will map directly on the overhead transparency and not on the base map itself.

5. If you are using teams, divide students into small groups. If possible, assign a volunteer or older student to assist each group. Explain to students that each team will be responsible for mapping different features of the site. You will need the following teams:

- Traffic patterns team: to study foot, auto and bicycle traffic on your site
- Water Flow/Topography Team: to observe contours and slopes of the site
- Existing vegetation team
- Soil Team
- Sun/Shade Team
- Adjacent Land Use Team
- History Team

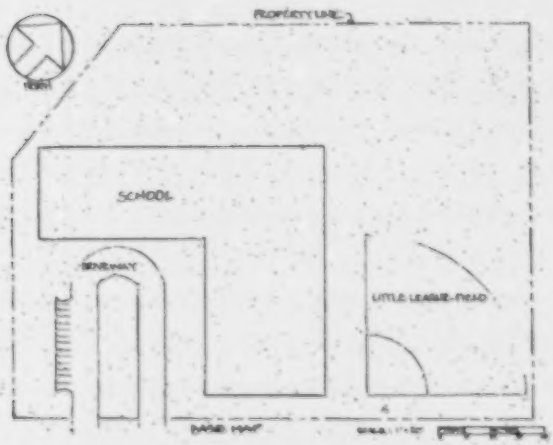
Consider encouraging each team to come up with a name for itself, relating to what it will do.

6. Show the outline map to students and explain what they see in detail. Students should be able to identify several landmarks on the map.

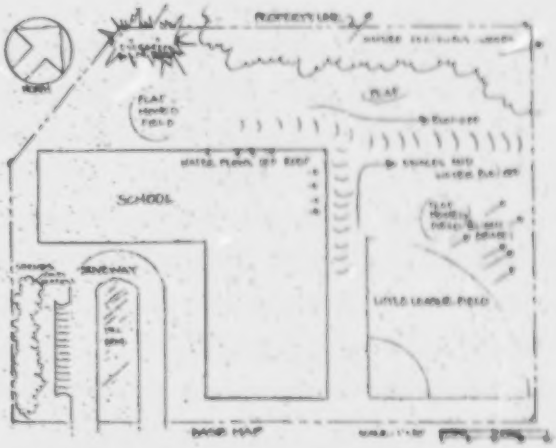
7. Give each group the appropriate inventory sheet to assist them in their investigation. Go through each sheet and explain what each item is and why it may be important. For example, traffic patterns are important because you do not want your habitat site in the middle of a high traffic area. Give each team a different colored overhead marker to map its assigned feature. Each type of site feature should be drawn in a different color to avoid confusion. Encourage all group members to help draw the site feature on the transparency.

8. Hand out clipboards and a compass to each group. Make sure at least one leader or volunteer is familiar with using a compass before beginning this exercise. Explain to participants that once they are outside, they should try to locate north with the compass, and then find it on the map. If anyone does not know how to use a compass, be sure to explain clearly how it works. Depending on the level of your students, you may want to do a separate compass activity prior to beginning this activity. See Appendix #2 for instruction.

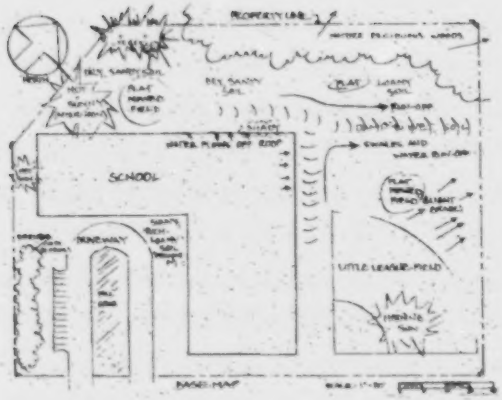
9. Once outside, show participants how to use the compasses, and let them try to figure out which part of the map points to the north. Tell them to find a corner of the map, draw a small arrow on it so that the arrow is pointing north, and label the arrow with the letter "N".



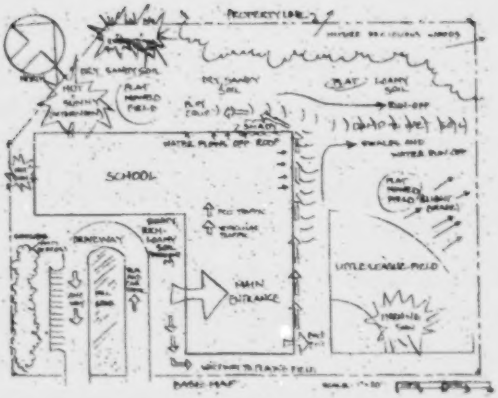
Base Map



Water Flow & Existing Vegetation Map



Soils, Sun & Shade Map



Traffic Patterns & Human Use Map

Check and make sure that the arrows are all pointing the same way, and that each group can name a few of the features on the map before going to the next step. Participants need to know where they are in relation to things on the map so that they draw their feature maps in the same direction.

10. Once groups have finished with their site feature maps, bring them back inside and place the base map on the projector. Put each feature map (ie: traffic pattern, soil) on the projector one by one. Have groups explain what their maps show. If participants are working from a piece of graph paper, have them share and discuss maps with class. Ask students to think about how their findings might affect their habitat decisions.

11. After discussing each transparency individually, place all the transparencies on the projector one at a time until they make one very detailed map. Ask students if all the maps together show them a good location for their project. Wrap up by reinforcing the importance of the site map. Ask the participants if they learned anything about the site that they did not notice earlier. What can they do with this information? Explain that they are now ready to move on in selecting and planning a site.

Note: *If an overhead projector is not available, create the base map on a large piece of poster or butcher paper. Make small copies of the base map on pieces of graph paper and have these serve as the site feature maps for participants. Another option is to put tracing paper over the graph paper so that the base map can be reused. When everyone gathers together after they have investigated their site features, have them explain their investigations and methods, present their findings and conclusions they have drawn from their work, and draw their part on the large map.*

Modifications for younger participants

Students in grades K-3 may have trouble understanding the abstract qualities of a two-dimensional map. For this age group, consider making one large three-dimensional model of the school building, out of blocks or other materials. Take students outside to assess the various inventory components. Then use symbols (i.e., blue construction paper for water) to represent what they found. Have students place these symbols around their model to show the results of the class inventory. When all everything has been incorporated, ask students what they learned about their site. Wrap up by having students look for patterns in their model that might point to a good place to put their wildlife habitat site.

BEST COPY AVAILABLE

Worksheet

Traffic Pattern Team

Team Name: _____

Look for:

1. Use of the site by people on foot: (i.e, Where do people gather, walk, etc.?)

2. Bicycle use:

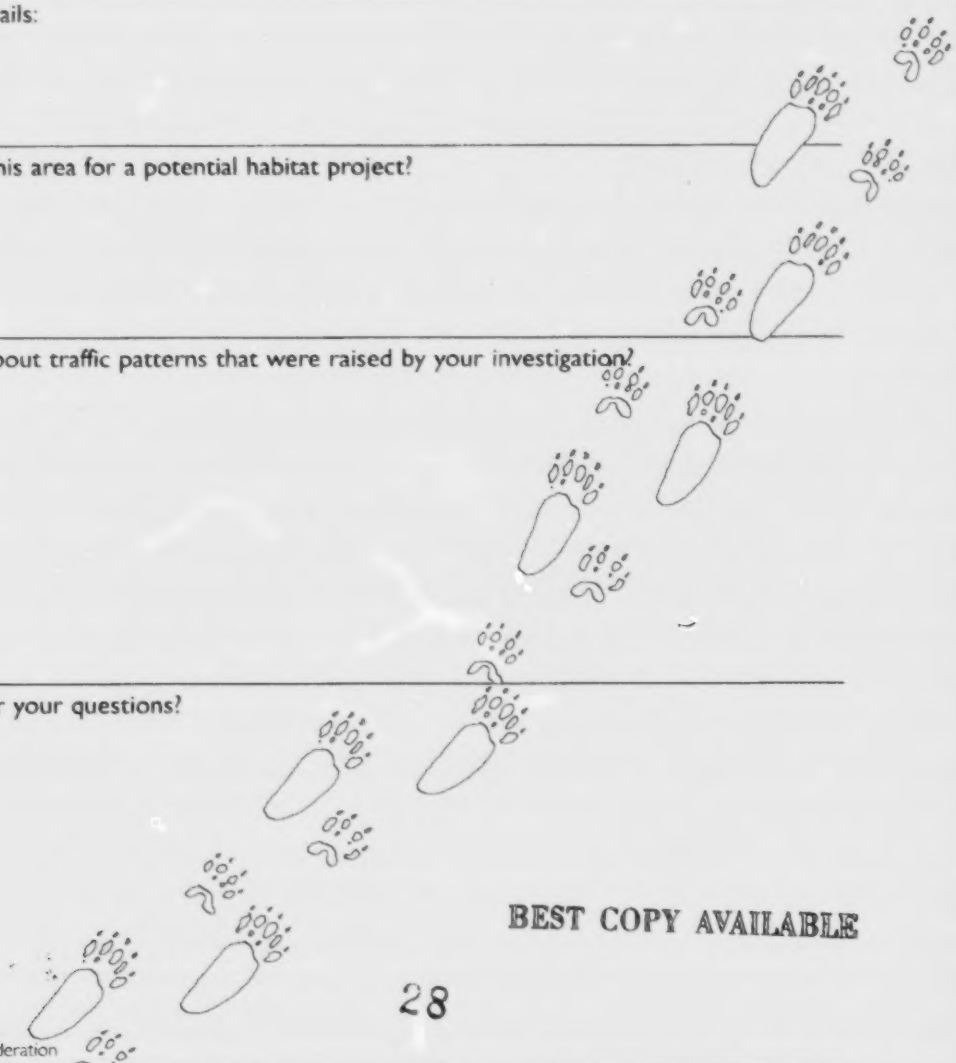
3. Auto use:

4. Any pathways or wildlife trails:

Any potential conflicts with this area for a potential habitat project?

Do you have any questions about traffic patterns that were raised by your investigation?

How might you try to answer your questions?



BEST COPY AVAILABLE

© Copyright 2001 National Wildlife Federation

Worksheet

Topography Team

National Wildlife Federation

Team Name: _____

1. Do you observe any hills, valleys or slopes?

2. Where does water flow when it rains?

3. Are there areas that usually hold puddles?

   Why?

4. Make note of any pipes, storm drains, sewers, on your map.

5. Find out how often it rains in your area:

6. Find out how much rain your area gets per month or per year:

7. What questions do you have about the shape of your area and how it will affect your choice of site?

   How will you answer these questions?

© Copyright 2001 National Wildlife Federation

Worksheet

Vegetation Team

Team Name: _____

Do a survey of the vegetation at your site. Note each observation on your base map.

Do you see:

1. Deciduous trees (those that lose their leaves in fall)?

2. Evergreen trees (those that keep their leaves or needles, all year)?

3. Shrubs?

4. Long or short grass?

5. Natural areas?

6. Landscaped areas?

7. What kind of each type of vegetation do you see? Use field guides to try to identify each one.

8. Are there a lot more of one type than another? Why do you think that might be?

9. What do you want to know about the vegetation that you've found here?

© Copyright 2001 National Wildlife Federation

Worksheet

Soil Team [redacted]

National Wildlife Federation

Team Name: _____

Instructions: Gather at least 5 soil samples from different areas of your schoolyard on a day at least 3 days after the last rain. Pick areas that have different kinds of vegetation growing, or different topography – such as a hill, by a stream, under a tree, on the open ground, etc. Compare the color, texture, and moisture content of each sample. The pH measures how acidic the soil is; this determines what kind of plants can grow there. If possible, obtain pH-testing materials for gathering this information.

Sample #	Color	Texture (sand, silt, clay)	Moisture	pH

What questions do you have about the soils you found at your site?

How might you start to answer them?

© Copyright 2001 National Wildlife Federation

Worksheet

Sun and Shade Team

Team Name: _____

Directions: Choose a sunny day to do your investigation. On a scale of 1-5 record on your map how much sun is falling on different sections of the potential site. Places that have no shade at all and are under bright sun should get 1's, while those that are under complete shade should get 5's. Record air and soil temperatures at each location. Try to repeat your observations and measurements at two other times of the day, to compare.

Full Sun | 1 | 2 | 3 | 4 | 5 | **Full Shade**

Location	Time Recorded	Sun/Shade Rating	Air Temp.	Soil Temperature

What questions do you have about the temperatures and sun/shade conditions you discovered?

Why is it important to know which areas are sunny or shady before choosing plants for your habitat site?

How will sunny and shady areas change with the seasons?

© Copyright 2001 National Wildlife Federation

Worksheet

Land Use Team

National Wildlife Federation

Team Name: _____

How is land used on your school grounds now?

How do your site's neighbors use their land?

How might that affect your Schoolyard Habitats project?

Do a survey of the surrounding areas, recording on all sides what you find.
(Examples: forest, buildings, pool)

Direction from site	Land Use	Possible Effects on Our Site
Example: N, S, E, W	*road*	*may generate fumes, noise*

What other questions do you have about land uses in your area?

© Copyright 2001 National Wildlife Federation

Worksheet

History/Local People Survey Team

Team Name _____

Instructions: In your group, generate a list of questions about your site and a list of people you think might be able to help you answer them, or whose opinions you would like to consider. Before the interview, make up an interview sheet, with all your questions written out, and with room for answers. Conduct an interview with each person (at least 3 different people), recording their answers carefully. Be prepared to present your findings to the whole group. Some ideas are below, but add your own – these are only to get you started!

People to interview:

- ☐ Long-time town resident
- ☐ Principal
- ☐ Parent who attended your school many years ago
- ☐ Local farmer
- ☐ Local business people
- ☐ Local nature center director
- ☐ Urban forester
- ☐ Long-time teacher

Sample questions:

- How long has this site been here?
- What was here before?
- What species of wildlife did you see here many years ago?
- What do you think of creating a wildlife habitat here now?
- Do you think it would help or hurt the local community?
- Do you have any concerns about a habitat site here? What are they?
- Can you recommend any resources that might help us with this project?

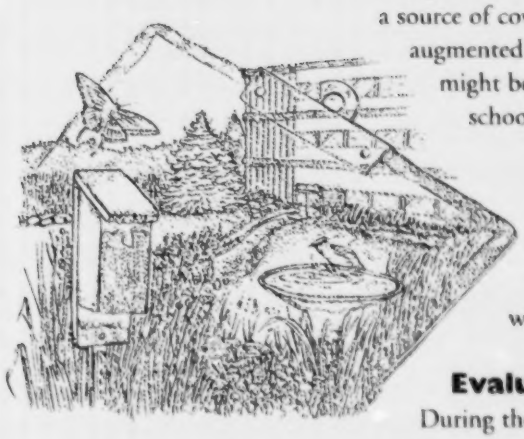
© Copyright 2001 National Wildlife Federation

Summarizing the Data

After the site inventory is complete, let participants know that the information gathered in the inventory will be referred to throughout the planning and design process. To be most useful, the information should be gathered and summarized. This should include the base map overlays, tables, charts, graphs, and narrative summaries.

Defining the Site

Once all the data is summarized, Habitat Team members can evaluate which area of the schoolyard is the best suited for a habitat site. Examine the summarized data and determine if the schoolyard has the essential habitat elements. While you are doing this, you should be able to determine where the Schoolyard Habitats site should be located. In some cases, a certain site may have already been designated. In other cases, students might have found that some areas of the schoolyard might already be frequented by wildlife. These areas may naturally provide some or all of the essential habitat elements. For example, perhaps your site inventory identified a small grouping of bushes in the corner of the site surrounded by turf grass. This would be an excellent place to start. The existing shrubs, if fruit bearing, may provide a source of food for local and migratory birds, while also providing a source of cover from potential predators. The clump of shrubs could be augmented by a couple of young trees, ground cover and a water source. It might be better to start here than a barren piece of land in the middle of the schoolyard.



Keep in mind the needs of both wildlife and humans. Plan the site to be accessible for classes to use (see pp.88-90) and for community members to visit. Guide students through this process of identifying the portion of the schoolyard or larger site best suited for a wildlife habitat area.

Evaluating the Site

During the site inventory, students identified existing wildlife habitat components on the schoolyard. In this step, students focus on the chosen site and determine which habitat elements must be enhanced or developed to attract wildlife. What was found? What needs to be added or changed?

When analyzing the new habitat site, keep in mind the four essential elements of a habitat – *food, water, cover,* and *places to raise young* . As a general rule of thumb, the greatest diversity of habitat elements will attract the greatest number of birds and other animals to the Schoolyard Habitats site.

You may want to use the worksheet on page 38 to help you with this process.

Food

The ideal wildlife management plan uses regionally native vegetation to supply as much food as possible to meet the year-round needs of many species. Shrubs, trees and other plants produce foods, such as acorns, nuts, berries and other seeds. Leaves, buds, catkins, nectar and pollen are equally important food sources.

Remember that **native plants** are the basis for the food chains in any given ecosystem. To attract local wildlife, use regionally native plant species, including trees, shrubs, perennials and annuals. Plants native to the soils and climate of your region provide the best overall food sources for wildlife. At the same time, they require less fertilizer, less water and less effort in controlling pests. Native plants may support 10 to 50 times as many species of wildlife as non-native plants. To identify plants native to your region, contact NWF, a local or state native plant society, a Cooperative Extension office, local garden center, state non-game wildlife program or nature center (see Resources section).

While plants are maturing, and during the winter months, natural food sources may need to be supplemented with feed. In bird feeders, use seeds from sunflowers, nigers, safflowers or proso millet and add cracked corn, meal worms or suet. In warm months, mix four parts water to one part sugar for hummingbird feeders, to supplement the birds' nectar and insect diet. Remember it is extremely important to keep bird feeders clean. Regular cleaning will prevent disease transmission to the birds.

Water

Throughout the year, wildlife needs water for drinking and bathing. Students may supply water in a birdbath, a small pond, a wetland or marsh, a waterfall powered by a re-circulating pump, or even a shallow dish. While vegetation holds droplets from rain or morning dew, a more constant, reliable source of water is a key element in a wildlife habitat site.

An elevated birdbath may protect birds from cats and other predators, and can be an attractive addition to the Schoolyard Habitats site. A shallow, wide-rimmed dish will provide water for small animals when placed on the ground near shrubbery or other cover. A small pond set into the ground can provide water for drinking, bathing, cover and reproductive areas for small fish, amphibians and insects.

In summer heat, be sure to replace water regularly and to keep birdbaths clean. In places where winter temperatures drop below freezing, maintaining a birdbath will involve either providing a birdbath heater or removing ice and refilling the bath with water daily.

Cover

Wildlife needs protective cover for raising young and hiding from predators. Plants that offer food can also provide cover. Densely branched shrubs, hollow logs, rock piles, brush piles, stone walls, evergreens, meadow or prairie patches and water provide cover for many animal species.

The ideal wildlife habitat area includes plants ranging in size and density from ground cover to tall, mature trees, including both evergreen and deciduous species. This variety of plant life provides birds and other animals with appropriate cover for feeding, hiding, courting and nesting activities.

Places to Raise Young

Wildlife also need safe areas for courtship and for nurturing young animals. To make a wildlife habitat complete, incorporate safe areas for breeding and egg-laying tailored to the needs of certain species. For example, include specific native plants upon which butterfly caterpillars depend or a shallow pond for tadpoles.

In providing places to raise young, consider using vegetation as well as human-made devices. Attach bird houses and nesting shelves to posts, trees or buildings. Maintain as many snags (dead, standing trees with hollow cavities) as possible. If den trees aren't available, erect bat and squirrel boxes for safe rearing areas. Plant dense pockets of shrubbery to provide safe areas for birds to nest.

Some of our most interesting animals require a body of water as a safe haven for their young. Many salamanders, frogs, toads and insects (including dragonflies and water boatmen) begin life in water and are unlikely to prosper without the safe, healthy water environment offered by a stream or small pond.

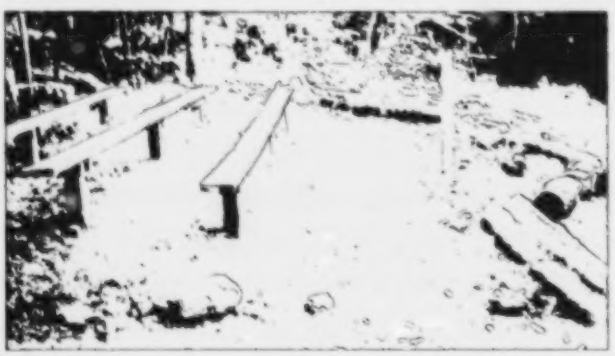
37

Assembling the Elements

Schoolyard Habitats Design

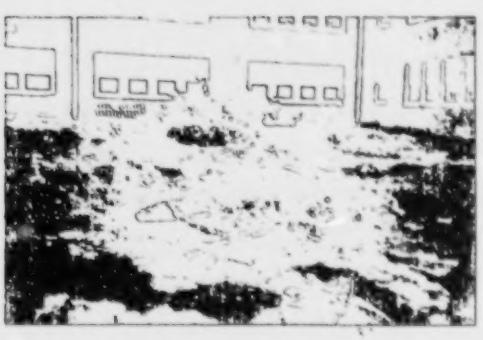
At this stage, students should create a list of "essential" components they will need to add to the chosen site. For example, if during the site inventory students found no water source for wildlife on the site, water would be one of the essentials, even though the group has yet to decide how water will be provided or where it will be located. Before beginning this next stage, have the class brainstorm about other essentials to add to the list. Then, students and the Habitat Team will be ready to start designing the Schoolyard Habitats site.

In the design process, take into consideration any features that will make the site more accessible as a learning environment. Many schools include some type of seating area (which can range from a circle of tree stumps cut from a fallen tree to picnic tables), or an open area where a class could gather. Consider pathways that allow access to many parts of the habitat (winding paths sometimes lend more access to plantings than do single straight ones). Of course, the use of these features will vary depending on the size of the site. Also think about features such as interpretive signs, microscope stands, viewing scopes, and any others you think would be useful.



If your school has limited space, consider a container garden or rooftop habitat. see Appendix #3 for more information.

Share the lists of essentials with students and other Habitat Team members. These elements must be included as they create their dream habitat designs in the Dream Habitats activity. This activity is geared toward students, but Habitat Team members also should draft their ideas. Consider asking other interested members of the school and local community to create their dream habitats as well.



Worksheet

Essential Schoolyard Habitat Elements

National Wildlife Federation

School: _____

Date: _____

To provide enough food, water, shelter, and places to raise young for wildlife, and places for people to use and enjoy the space, we recommend adding the elements below:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

© Copyright 2001 National Wildlife Federation

Activity 3
Dream Habitats

Summary

Students will use the information they have gathered in the site inventory to make recommendations about what should be included in their schoolyard habitats site.

Grade Level: *2-8*

Time:
2-3 class periods

Subjects:
Writing, Math, Art, Science

Skills: *Analysis, description, comparison*

Learning Objectives:
Students will be able to:

- *Compile and synthesize information collected in prior activities to prepare feasible ideas for the schoolyard site*
- *Create a model Schoolyard Habitat*
- *Present ideas clearly and concisely*

Materials:
- *Cardboard*
- *Art materials*
- *Clay*
- *Paint*
- *Natural materials (e.g. pebbles, sticks, dried leaves)*
- *Library books (on various garden features)*
- *Garden magazines*
- *Native seed catalog*
- *Dream Habitat Worksheet (p.42)*
- *Peer Assessment forms (p. 41)*

Preparation - Getting Inspired

Before beginning this activity, take some time to trigger student imaginations. The richer and more varied their experience with and exposure to gardens and wildlife habitats prior to the activity, the more detailed their dream maps will become. Depending on time and resources, take students to a nearby botanical garden, community garden, children's garden or a certified Schoolyard Habitats site (visit www.nwf.org for a current list) to give them ideas about their own site. When visiting a garden or natural area, make sure students have quiet time to enjoy the place, write in a journal or talk about how they feel when they are there, and what they like about the outdoor area. These pleasing features are the types of things they will want to have fresh in their minds when they create their Dream Habitat. This will also give students a chance to make a link between the environment and how they feel. One of the many side benefits of Schoolyard Habitats sites and other school greening projects is the peaceful oasis they provide for youth.

If a field trip is not feasible, consider sharing some of the wonderful gardening books written for children. Stories with illustrations of gardens visited by wildlife and students, or that contain a wide variety of garden features, would be ideal. Also consider books which tell stories of the successful transformation of a small area into a community-building, flourishing garden, such as *City Green* by Dyanne DiSalvo-Ryan or The *Garden of Happiness* by Erika Tamar. Otherwise, have students close their eyes, while the teacher reads a vivid description of a wildlife habitat and all that a visitor might hear, smell, feel and see while there.

Procedures:

1. Creating Our Dream Habitats

After visiting an inspirational outdoor area, students will be ready to design their Dream Habitats. Take students to the location of the future Schoolyard Habitats project to remind them of the site's size and shape and the information they have gathered from their site inventory. Give them quiet time to sit in the area, make note of what is currently there and begin thinking about wildlife they would like to see invited into their schoolyard and new features they would like to see added based on their findings during their inventory.

2. Back in the classroom, remind students of the four essential components of habitat that must be included in their design. Have them think about other features they might enjoy in the habitat. If they went on a field trip, as recommended above, have them review notes and think about the features of the outdoor space they liked. Prior to the class, check out a number of library books or magazines for students to browse through for ideas or have older students research wildlife in your area and habitat requirements. Bring in books on garden seating, water or fountains, or on native plants and animals. Many gardening books, even those geared to adults, have beautiful color photos. Have students browse through the provided books and magazines before getting started. Students may first want to make drawings of the habitat. Then, supply a large variety of art materials so students can make colorful, detailed 3-D models of their dream habitats.

At this 'dreaming' stage it is not so important that the designs be to scale. Visiting the site with your class right before they begin will help remind/inform them of the basic dimensions with which they are working.

3. Sharing Our Dreams

In this "sharing" component, students will have the opportunity to share their ideas orally with classmates, in written form with the Habitat Team and visually with the wider school community.

4. Once models are completed, have students give short presentations, noting important or special features of their habitat to their classmates. Remind students of the qualities of a strong presentation (i.e. eye contact, speaking slowly, etc.). During each report, have classmates fill out the peer assessment forms (a sample is provided on page 41) to ensure active listening. Educators or students should keep track of the features and components that appear most often in the dream habitats. After presentations, guide students to decide on the most appealing and critical elements that will need to be included.

5. Students should now prepare to compile the most popular features included in student dream habitat designs. For example, if the majority of the class chose to include a birdbath in the design, this may be something that should be included in the actual site design. Discuss with class until they come to a consensus on the elements and features from dream habitats that should be included in the site design. Have students refer back to their original Vision worksheets and compare their original thoughts to their current ideas. How much of the original vision is still there? What has changed, if anything?

6. Have students write down the priorities and present them to the Habitat Team. Students should brainstorm on the best means through which to clearly communicate this data. The class may, for instance, choose to graph their results to make them easier for the Habitat team to digest (and allow students to practice math skills).

Example:
Total students in Mrs. Smith's class: 25
Numbers of Students in Mrs. Smith's Class Whose Dream Habitats Included:

	#	%
Birdbath:	20	80
Stone bench:	7	28
Butterfly garden:	12	48

7. Publicly displaying the visual models produced by students and others is an excellent way to build school-wide interest and support for the project. This is not just a creative exercise, but a way for the whole community – students and adults – to give their input and ideas, realistic and fantastic, about the site. A display also provides a way for the Habitat team and the whole community to view each other's ideas – consider scheduling a Dream Habitat Show to coincide with a Back-to-School night or other school community event.

8. Ask students to create explanatory tags to accompany their models during the show. They may fill out a "My Dream Habitat" sheet (sample provided on page 42) or create another tag format. Explain to students that the tags are comparable to tags placed next to paintings in a museum – they are a chance for students to interpret their models for viewers. In addition, the tags will help draw attention to the special or critical features included in the dream habitat.

BEST COPY AVAILABLE

Worksheet

Peer Assessment Form

Peer Assessment Form

Name

Presenter's Name

Comments on Your Presentation

My Favorite Thing About Your Dream Habitat

One Question I Have For You About Your Dream Habitat

Peer Assessment Form

Name

Presenter's Name

Comments on Your Presentation

My Favorite Thing About Your Dream Habitat

One Question I Have For You About Your Dream Habitat

Peer Assessment Form

Name

Presenter's Name

Comments on Your Presentation

My Favorite Thing About Your Dream Habitat

One Question I Have For You About Your Dream Habitat

© Copyright 2001 National Wildlife Federation

Worksheet

My Dream Habitat

National Wildlife Federation

Name _____

In my model, this is how I provided for:

FOOD

WATER

COVER

PLACES TO RAISE YOUNG

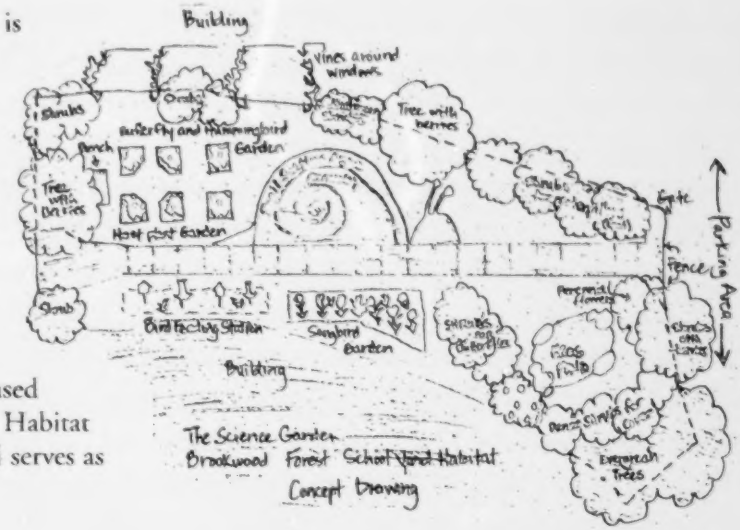
Other special features of my dream habitat:

© Copyright 2001 National Wildlife Federation

Defining Your Schoolyard Habitats Project

The Habitat Team will need to take student and community ideas into consideration when developing a final design plan for the site. Actual planting and construction of all habitat features at these sites may represent three to five years of effort by the school communities involved.

Remember a professional site map is not necessary. Each site will have different assets and constraints and will result in a unique combination of elements that are suitable for your particular schoolyard.



Selecting the Materials

Once the design is agreed upon, the team will need to focus on materials, especially plants, to be used in the creation of the habitat. The Habitat Plant Selection activity on page 44 serves as a guide in this process.

Involve students in real research needed to make thoughtful decisions about the Schoolyard Habitats site. Involving students in selection of the materials to be used in the habitat presents a great educational opportunity. The following activity focuses on a student-driven plant selection process. However, this concept could be extended to investigating materials for benches, water sources or other features. Educators may want to divide the tasks included in plant selection among different groups, classes or grades within the school. For example, 3rd graders could be responsible for making official recommendations for plantings to attract butterflies to the site, while 4th graders could recommend native tree species to include.

Students may simply send their recommendations for trees or butterfly garden plants to the Habitat Team in writing. Or, ask students to prepare formal presentations for the Habitat Team (a good opportunity for students to practice their oral presentation and public speaking skills). There are many ways of approaching the process, but developing student expertise in specific habitat features can never happen too early.

BEST COPY AVAILABLE

Activity 3

Habitat Plant Selection

National Wildlife Federation

Summary

Students will research and recommend native plants and trees to include in the design of the habitat site.

Grade Level: *3-8; K-2*

Time:
2 class periods (90 minutes) (This activity could be done as a research project for older participants, lasting several weeks.)

Subjects: *Science, Geography, Art, Language Arts*

Skills: *Research, analysis, description, evaluation, synthesis*

Learning Objectives:
Students will be able to:
- *Define native and exotic plants.*
- *Identify at least three benefits to planting native species.*
- *Apply their knowledge of plants and plant-animal interactions to the selection of plantings for the Schoolyard Habitats project.*

Materials:
- *Region-specific field guides to plants, insects and animals*
- *Native plant guides*
- *Native plant seed catalogs*
- *Copies of Plant Selection Worksheet*
- *Pencils*

Background

When selecting plants for the site, choose plants native to your specific region. Native plants best meet the food and cover needs of local wildlife, and will help to support biological diversity on the local level. Selecting native plants is not only beneficial to wildlife and the environment, but to the gardener as well. Native plants require less work to maintain, including less water, fertilizer and pest control, leaving more time to observe and enjoy the natural space. Exotic plants are plants that have been imported from a different region (exotics in the U.S. often come from Asia or Europe). Frequently, these plants do not thrive in their new landscapes without increased use of resources, either natural (e.g., water) or synthetic (e.g., synthetic fertilizers and pesticides). In general, exotic plants are unable to sustain a wide variety of wildlife. They also can be invasive, which means that they reproduce rampantly and replace native (sometimes endangered) species.

Whenever possible, include plants that will: (1) provide nectar, seeds, pollen, fruit (2) increase insect numbers to provide the greatest variety of food sources for wildlife, and (3) provide year-round food sources. Remind students that the greater the variety of species planted in a habitat site, the greater variety of animals attracted.

For native plant resources and supply sources, look in the Resources section (page 66) or on the NWF website www.nwf.org/.

Procedure

1. Reinforce the benefits of selecting a variety of plants for the Schoolyard Habitats site. Define and discuss the benefits of using native plants, both for the environment and the gardener. Explain that exotic (or non-native) plants often disrupt the balance of a local ecosystem.

2. For students who are able, this project should be research-oriented. Introduce students to the concept of a climate zone using a U.S. zone map (available from seed companies and nurseries). Ask students to identify the zone they live in and other regions with similar climactic conditions.

3. Have students review the data from the Site Inventory activity to have a clear idea of the physical environment of the site. What was the level of sunlight, the type of soil and the moisture conditions at the site? They will need this information to select appropriate plants. (If your class did not participate in that activity, they should solicit findings from the Habitat Team or another involved class, and familiarize themselves with it before starting the plant selection process.)

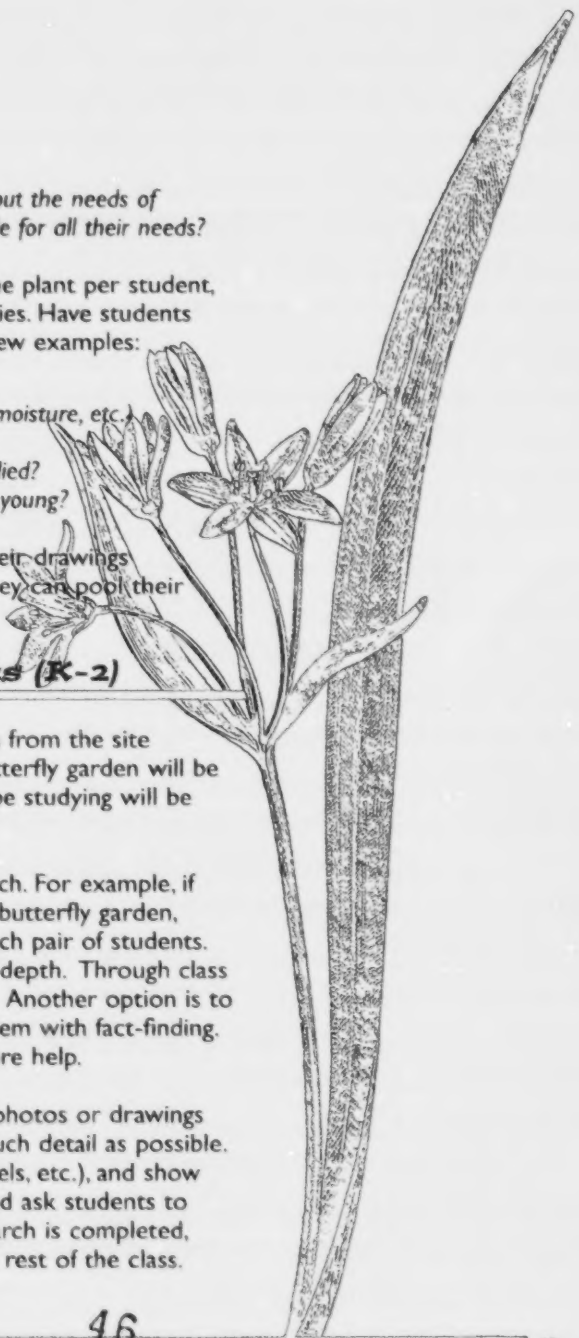
4. Encourage participants to select a variety of plants (e.g., different heights, foods produced, etc.) to enrich site diversity. Have field guides and other resources available for reference. If possible, have a list of recommended plants for the region and/or region-specific field guides available to help participants narrow their search. Features to consider in selecting plants:

- *Color*
- *Your climate zone*
- *Height*
- *Sunlight requirements*
- *Moisture requirements*
- *What will this plant offer to wildlife?*
- *Is the plant native?*
- *Which animals will the plants attract? Students learned about the needs of specific animals in prior activities. How can they now provide for all their needs?*

5. At some point, the species list should be limited to one plant per student, so each student can do deeper research on a specific species. Have students generate a list of questions to answer about the plant. A few examples:

- *Where does the plant grow?*
- *What does it need to be healthy? (e.g. how much sunlight, moisture, etc.)*
- *Is the plant used by humans for anything?*
- *What is the most interesting thing about the plant you studied?*
- *Do any animals use it for food, cover or as a place to raise young?*

6. At the end of their research, have students present their drawings and findings to their classmates. Once reports are done they can pool their information on a chart (as shown on following page).



Modifications for Younger Students (K-2)

1. For younger students, summarize relevant information from the site inventory for them (i.e., because the corner where the butterfly garden will be located is an area that gets no shade, all the plants they'll be studying will be ones that require full sun).

2. Assign each pair of students a type of plant to research. For example, if students are responsible for recommending plants for the butterfly garden, provide an example of one butterfly-attracting plant for each pair of students. During this activity, students will get to know one plant in depth. Through class presentations they will come to learn about several more. Another option is to have older students team up with younger pairs to help them with fact-finding. Otherwise pair stronger readers with those who need more help.

3. Ideally, obtain a sample of each of the plants or have photos or drawings readily available. Have students draw their plant with as much detail as possible. Have students describe their plant (how it looks, smells, feels, etc.), and show how it provides for wildlife. Provide reference materials and ask students to try to find a few more facts about their plants. Once research is completed, students should present their drawings and findings to the rest of the class.

BEST COPY AVAILABLE

Plant Selection Chart

National Wildlife Federation

Plant Name				
Wildlife Attracted				
Blooming Season				
Height				
Color				
Soil Type &Moisture Needs				
Sun Exposure				
Plant Name				
Wildlife Attracted				
Blooming Season				
Height				
Color				
Soil Type &Moisture Needs				
Sun Exposure				

© Copyright 2001 National Wildlife Federation

Project Planning

Once the class has chosen plants and other habitat elements, revisit the goals originally outlined. Assess the monetary, material and volunteer time needs of the plan. Look at the short-term and long-term goals that were outlined earlier and make changes as necessary, adding in more specific timelines. Delegate responsibilities within the team. Because habitat development is an ongoing and long-term process, periodic check-in meetings and effective communication are essential to success.

Reaching Out to the Community

In the next step, the team will focus on acquiring the needed materials by reaching out to the community. Many school groups have obtained in-kind donations and volunteer support to begin planting and construction.

Community assistance can come from a wide variety of sources: landscape architects ready for a new challenge; local businesses willing to donate plants, plant materials and expertise; garden and civic clubs excited to offer their knowledge, time and hands-on involvement. Ask parents and colleagues for their ideas about resources or local businesses that they think might be approachable. Arrange for a listing or an article in the local newspaper to help get the word out about the project and needs. Send out a press release. Another effective way to approach the community is through student letters. Local businesses and organizations often respond to student requests with enthusiasm. Time and effort are involved in locating these individuals or groups, but what they provide (material contributions, in-kind support, expertise and resources) are invaluable to the project. Efforts to secure financial, technical and other support from the larger community will be ongoing. It is important to remember that money does not need to be a limiting factor to the success of the project.

Fundraising Strategies

In-kind donations and volunteers are the lifeblood of a successful Schoolyard Habitats project. Yet, it may be necessary to secure monetary support as well. Local and federal public agencies may have grant programs to fund educational projects focusing on wildlife and habitat issues. Additionally, many private foundations and nonprofit organizations offer grants for such projects. Look at the listings of national and regional grants sources in the Resource section and on the Schoolyard Habitats website.

Schoolyard Habitats projects may also find support through a host of other creative fundraising ideas. Tried-and-true methods like car washes and bake sales can help raise funds. Other schools have been successful in appealing to the community to "adopt" a plant in their habitat site, or to buy engraved bricks or stones to be placed in a garden wall or used as stepping stones in the habitat area. Be creative – brainstorm with colleagues, parents, administrators and community organizations to help think of other options. Use the following budget planning worksheet to sketch out all items you need, estimate their costs, and potential sources of funds or donations.

Worksheet

Budget Planning

National Wildlife Federation

Items	Estimated Cost	Fundraising Strategy/Source	Point Person
Example:			
Plants	*$100*	*PTA funds*	*Mrs. Cooper*
Fencing	*$250*	*donation from Community Fencing Co.*	*Mr. Smith*

© Copyright 2001 National Wildlife Federation

Activity J

Breaking New Ground

Summary:

Students begin the project by clearing and preparing the ground.

Grade Level: 1-8

Time: 2 to 8 hours or more, dependent on size of habitat and number of participants.

Skills: Construction, application, problem-solving

Learning Objectives:
Participants will be able to:

- Demonstrate basic use of gardening tools.
- Utilize basic safety precautions.
- Use tools to prepare site for planting.

Materials: *Largely dependent on circumstances. (Note: Many companies manufacture child-sized gardening tools and gloves. Selecting appropriate tools will help with successful student involvement.)*
Some examples include:

- A flat-bladed, sharp shovel, for cutting sod, prying soil, or removing plants.
- A pointed shovel.
- Gardening gloves.
- A hand mattock (looks a little like a small tomahawk), for cutting roots.
- A wheelbarrow and buckets, to move plants, soil, or tools.
- Pruning shears, to cut vines, branches, or saplings.
- A tree saw (curved blade) for larger work.
- Stakes (and a mallet), string/rope, logs, or some system to mark off the area.
- Pitchfork or hoe, to loosen the soil.

Background

Breaking new ground will mean different things to different people. A group planting a habitat at the edge of a woods may decide to remove a few of the more aggressive shrubs and/or exotic plants, loosen the soil in selected spots and plant there. Some groups in more urban areas may have gotten permission to tear up asphalt, or they may have decided to build raised beds. A team enhancing a wetland area would need to keep soil disturbance to a minimum. Once the group has assessed the steps involved in prepping their site, the digging, loosening, pruning, and rock removal may commence.

More often than not, "new ground" will include a portion of lawn, often a tough mat of shallow-rooted, flat-bladed grass. It is important as a first step to remove this non-native, aggressive grass from the site. Aggressive plants that were introduced from another region are called invasive exotics. These exotics will crowd out native plant species and greatly reduce the diversity of plant and animal life in the area. See the background section of the Habitat Plant Selection Activity for more information about invasive exotics.

Since the method of preparing a site is so variable for each site, the information included here is very general. Resources specific to a particular type of site and methods of site preparation might include regional gardening books, websites, a local expert, or a local garden center. Also see Appendix #3 for information on container/rooftop gardens

Procedure:

1. The group should first assess what sort of preparations they need to make for the site (e.g., debris removal, asphalt breaking, creating raised beds, etc). A detailed site map will provide clues, as will a well thought-out design.

2. Have the group select appropriate tools. Explain, and demonstrate the proper use of each of the tools. For example, participants using a flat-bladed shovel should only use it to cut into soil and pry, they should keep hands and feet away from the blade, and they should always keep the blade end below knee level. Break into small groups and have students practice using tools.
If possible, assign a volunteer or older student to assist each group. To prevent injury, it is important to review proper lifting techniques. Have participants practice lifting with their legs, knees bent and back straight.

NOTE: *This is not a comprehensive set of safety precautions. Compile a set of safety precautions by contacting the tool's retailer, manufacturer, or other reliable source. Make sure to read all pertinent labels.*

3. Assign specific jobs and areas for each participant and explain each job as it comes up. Some of the major job descriptions follow.

4. Mark off the site. If the plan includes loosening a good deal of soil, take preventative measures so that a lot does not wash away. An erosion prevention device might be as simple as lining the plot with 3"-5"-diameter logs and staking the logs in place.

5. Remove plants that will negatively impact the site, especially aggressive, fast-growing exotics. Leave native plants; if they are in the pathway of your project, dig up and transplant to another area. Watch carefully for poison ivy, poison oak, poison sumac, thorny plants, and stinging nettles, (If these plants grow in your area, and no one in the group knows how to identify them, consult a field guide or a local expert). The removal process will vary for different types of plants.

6. Since it is such a common and usually daunting task, here are some options for lawn grass removal:

- One option is to lay down cardboard on the plot, and cover the cardboard with at least 6 inches of leaf mulch. This not only kills the grass; it makes for good, rich soil. Starting this process in the fall gives the cardboard and mulch time to degrade. Planting should begin only after the cardboard has degraded enough for roots to maneuver through. This could take several months, so it is best to start in the fall for spring plantings.

- Another way to kill the grass is to put a big piece of green or clear plastic over the plot and let it bake in the sun. If this is done in mid summer, the grass is relatively short, and the plastic stays intact, it may take as little as two to three weeks. It may take a few months at other times of the year. It should be done when grass is actively growing (i.e., lawn mowing season).

- Some people choose herbicides when working with very large plots of lawn grass. Only licensed professionals should handle herbicides. They are aware of safety issues, know what time of year to apply them, and know how much they need to apply. If this is the only option, do some research and recommend herbicides that biodegrade quickly and do not stay in the system for a long time. Otherwise herbicides can kill other plants, leach into and poison the ground water, or run off into streams and do much more damage than was intended. They may have effects on children as well. Herbicides should only be considered in cases where all other options do not work.

- A sod-cutter will cut the sod into strips, which can be rolled up, removed and saved for compost. An experienced adult should run this machine. Sod-cutters are available for rent at local equipment rental centers.

- A group with a small plot and a lot of muscle power can cut and pry out sod with a sharp, flat-bladed shovel. Cut small squares, about 1 1/2 inches deep, and pry out the pieces of sod. Set the squares aside and use them later for compost. Note, however, that lawn grass is hardy stuff; it will grow back (even upside-down!) given the chance. A few weeks under a plastic tarp in warm weather should kill it and make decent compost.

7. Once sod and any invasive plants are removed, where necessary cut roots and break apart tough soil with a hand mattock. Generally, it is not necessary to totally till the soil. In most areas the plants will do fine if the soil is loosened enough for roots to spread. The depth of soil to loosen depends on the needs of different plants.

8. Pull out medium-sized rocks, and set them aside. A rock pile on the site can provide shelter for beneficial insects, toads, chipmunks, etc. Leave small and really big rocks. The small ones will not hurt anything, but attempting to move the really big ones might hurt the mover. Removing a large rock will also leave a big, hard-to-fill cavity in the ground.

9. When the soil is ready, it is time to start planting!

Note: *Have water, sunscreen, and a first aid kit available. Take appropriate rest breaks.*

Activity 3

Planting Your Schoolyard Habitat Site

National Wildlife Federation

Summary:

Students plant their selected vegetation on the habitat site.

Grade Level: K-8

Time: 2 to 6 hours or more, depending on size of habitat and number of participants.

Skills: Application, construction, problem-solving

Learning Objectives:
Students will be able to:

- Demonstrate basic proper planting techniques and requirements.
- Place appropriate plants in their new habitat site, according to their site plan

Materials:
- Gardening gloves
- Shovels
- Rakes
- Hand trowels
- Water source (hose, watering can, etc.)
- Buckets
- Plants (i.e., trees, flowers, shrubs, seeds, etc.)
- Tree protectors (if planting seedlings)
- Mulch
- Compost or other organic material
- Plant markers and a permanent marker

Background

After weeks of researching, planning, and preparing it is now time for the real fun - planting the habitat! Participants will be thrilled to see their plans become an actual wildlife habitat. (You may want to create a school-wide planting day, or choose a weekend so parents and community members can participate).

While there are general planting guidelines to follow, each plant is unique. Most plants, seeds, and bulbs come with suggested planting depths and spacing measurements, as well as sun and soil requirements. If this information is not provided, ask the nursery staff for planting suggestions. When planting, keep in mind the size of each plant at maturity. At the same time, it is important to remember that things grow closer in nature and often grow in clusters, so do not be afraid to group plants together to form tight-knit communities. If large gaps are left between plants, nature will fill them in, often with unwanted invasives that can take over the habitat. Spacing decisions should be made prior to the day of planting.

Procedure

1. Gather all required equipment. Plants should be purchased ahead of time. If possible, take students on a field trip to a nursery to purchase the plants. The site should already be prepped; see previous activity for complete details.

2. Review the site design plan for the habitat with the group, including what plants go where. Go over general planting instructions (e.g., hole size, watering, mulching, etc.). Consider planting a shrub or plant as a demonstration. Review tool and safety issues as needed.

3. Divide participants into groups, assigning each group a certain area of the habitat to plant. If possible, assign a volunteer to assist each group. Give the participants area/plant specific instructions including how far apart plants should be spaced.

4. Begin planting. Remember, enthusiasm is contagious, so have a great time digging in the dirt!

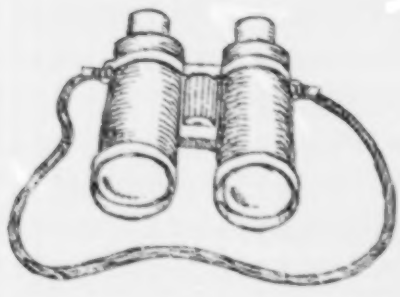
5. Have participants label plant markers (available at nurseries and garden centers) in permanent ink. Place in appropriate spots throughout the habitat to identify plants and educate visitors. Following the site design plan, have participants place additional elements in the habitat (e.g., benches, birdfeeders, etc.).

Note: Have water, sunscreen, and a first aid kit available. Take appropriate rest breaks.

Planting Guidelines

Plants and Shrubs:
Dig a hole the same depth and slightly wider than the container the plant came in. Remove the plant from its container and gently loosen the roots. Place in the hole and cover with backfill (soil from the hole). Gently pat down the soil to be sure there are no large air pockets, water, and apply mulch.

Trees:
Dig a hole twice as wide and no deeper than the container the tree came in or the height of its rootball. Remove the tree from its container or burlap wrap. Gently loosen the roots and place in the hole. Water for several minutes. Fill in the hole with backfill, pat down the soil and apply mulch. Be careful not to pile mulch around the tree trunk, as this traps heat and moisture and can cause the bark to rot. Use a tree protector (available at nurseries or through gardening catalogs) when planting seedlings. This will protect small trees from errant lawn mowers and hungry deer.



Bulbs and Seeds:
Refer to planting directions on packaging, water, and mulch. If desired, start seeds several weeks in advance as an additional activity for participants.

Soil:
If the soil is in poor condition in the area, mix some organic material such as compost in with the backfill. Be sure to match plant needs with soil conditions. Adding soil amendments can slightly alter the soil quality, but the basic needs of a plant must be met by the existing soil for the plant to thrive.

Watering:
Apply water generously, making sure to reach the roots and not just the surface. After the initial planting, water approximately once a week with 1 inch of water, although amount will vary with weather conditions and soil type. If possible, water with a soaker hose or other drip irrigation system. Native plants will require watering periodically for a full growing season to help them become fully established. Once established, they should not require watering except in times of extreme drought.

Mulching:
Apply at least a one-inch layer of mulch to the soil surface. There are a variety of mulches available including wood chip, leaf, and pine needle. Use what is readily available and fits the project budget. Not only does mulch look attractive, it helps hold in moisture, adds nutrients, and helps cut down on weed growth.

Maintenance

Creating a habitat-based learning site at school lessens the need for traditional maintenance of the area. Nonetheless, some work is required, particularly in the beginning, to maintain the site. Most programs, once started, find plenty of willing supporters interested in volunteering time for maintenance. Usually, students do most maintenance throughout the school year. If sharing the responsibilities with other classes, make a work schedule for each semester.

However, you still need to plan for the watering, weeding and general upkeep of the habitat site over the summer months and other holidays when fewer students are at the school. Contact summer school teachers to see if they are interested in incorporating the habitat site into the summer program. Their students can enjoy and maintain the site during the summer months. Alternatively, different teams of students and parents or neighbors can sign up to take care of the habitat for a specific week of the summer. Attention to maintenance issues is an extremely important aspect of creating a Schoolyard Habitats site – it ensures that students can return to school in the fall to continue the enjoyment and learning opportunities of the habitat site. Even if students are not directly involved in summer maintenance, they can make their contribution to the longevity of the habitat by creating a care guide, as outlined in the following activity.

Activity

Creating a Field & Care Guide

National Wildlife Federation

Summary

Students create a guide to the habitat site that includes a map and instructions on maintaining the site.

Grade Level: *K-8*

Time: *2 to 5 class periods (time depends on the number of elements included in the guide and the number of participants contributing)*

Subjects: *Language Arts, Art, Science, Geography*

Skills: *Classification, description, generalization, research, synthesis*

Learning Objectives:
Students will be able to:

- *Write a guide to the plants and other features found in their Schoolyard Habitats sites*
- *Create guidelines for site maintenance*
- *Describe site features to future students and community members*

Materials:

- *White or colored paper*
- *Scissors*
- *Stapler*
- *Glue*
- *Pens, pencils, colored pencils, markers*
- *Regional field guides and other resources*
- *Care instructions that accompanied plants when purchased*
- *Pictures of plants, if available*
- *3-ring binder*

Note: *If the class has access to typewriters or computers, consider having them type the text and insert graphics into the document. Laminating the pages will make the guide last longer. In any case, bind the final product in a 3-ring binder so that additions and changes will be easy to make over time.*

Background

Creating a field and care guide for their Schoolyard Habitats site is a great way for students to apply all that they have learned, while creating a useful, educational tool for others. The guide can be used as a learning resource for other classes, school visitors, parents and community members who want to take group or self-guided walks through the site.

This field guide will also include instructions on how to care for the Schoolyard Habitats site. During the school year, many students can participate in the maintenance and care of the site. The maintenance section will help streamline procedures and help during holidays and summer when people unfamiliar with the site may be helping out. In this activity, all students involved in the project will pool their knowledge to ensure the stewardship of the site.

In addition to providing detailed instructions about caring for the wildlife habitat site, participants may want to add creative pieces to the guide, such as artwork, poetry, photos of plants, wildlife and the site (before and after), a special note to caretakers, and a dedication page.

This guide can also serve as a culminating assessment for student understanding of their habitat project.

Procedure

1. Divide the class into groups, or divide the work between various classes in school. Each group or class will produce one section.

Sections should include:

◆ ***Habitat Map***

Ask students to draw a map of the Schoolyard Habitats site that someone else could use to locate specific features. For older students, this is an opportunity to teach students to map to scale; for younger students emphasize the importance of details in the maps. Students may want to color code or create a key for their maps, clearly indicating pathways, types of gardens, locations of birdfeeders, maintenance supplies and entrance.

◆ ***Plant List and Care Instructions***

Much of this work will have been done during the plant selection activity, but have students organize and expand the plant information. For each tree, plant or flower in the habitat, groups should create one or two pages. Include plant names (common and scientific), pictures (can include photos, drawing, dried leaf, leaf rubbing, etc.), description (can include height, spread, type of leaves, flower color, plant uses, how it benefits wildlife, etc.), and plant care and growth requirements (soil, light, moisture and pruning needs).

◆ ***Special Features***
This section can include descriptions of features other than plantings that have been included in the Schoolyard Habitats site. This is where students can describe the purpose and success of ponds, bird feeders, compost bins and any other unique features.

◆ ***Wildlife Sightings***
This section may require setting aside time for first-hand observations. Alternatively, create a journal that all habitat visitors can use to record what kinds of wildlife they saw at the site. Students may also want to poll other students in the school for a list of all wildlife seen at the site. A small amount of information, such as hints on where to look for the animal will help visitors trying to locate wildlife.

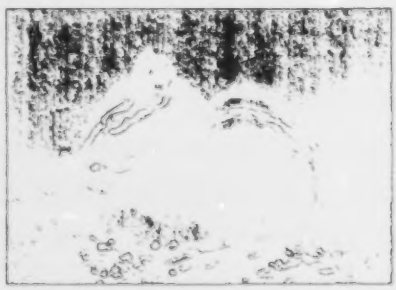
◆ ***General Habitat Maintenance***
Students should compile descriptions of the general Schoolyard Habitats maintenance needs, including how often these tasks must be done and any special equipment needed. For example, students may need to write down how often they refill a birdbath and how often they must clean it.

◆ ***Seasonal Habitat Maintenance***
In this section include maintenance tips for different seasons. In winter, feeders may need to be filled more often. In summer, water supplies might need to be replaced daily instead of twice a week.

◆ ***Cover Design, Artwork and Acknowledgments***
The cover and artwork pages (which may be interspersed throughout the guide) are ideal places to feature student creativity. Consider leaf prints, painting with berries from the garden or using dried flowers in a collage. To highlight how the site has impacted students personally, they may want to add short creative writing pieces or poetry written about the site. The acknowledgment page should include the names of all those who helped create the Schoolyard Habitats site, as well as all of those who donated time or materials to the project. You may want to include a photograph of the students and other members of the Habitat Team.

2. Once sections are complete, put into a 3-ring binder. To ensure the only copy you have is not destroyed, make color copies and/or laminate the pages. You may want to store a copy in a "visitor's box" near the site, and keep another in the school lobby, office or library.

3. Tell other teachers and community members where the notebook is kept (preferably in an area that others can access). Add new pages as they are created, and the site develops over time.



The time and effort the **Curriculum Committee** dedicates to making the connection between school curriculum and the Schoolyard Habitats project is just as critical as that invested in the planning and creation of the habitat site itself. The purposes of NWF's Schoolyard Habitats Program are to build: 1) awareness of habitats (by instilling in students a sense of wonder and discovery), 2) knowledge of how habitats work and why they are important, 3)habitat investigation skills, and 4) skills and knowledge required to protect and restore habitats through action projects, specifically focusing on creating Schoolyard Habitats sites.

Schoolyard Habitats projects are excellent action projects because they result in increased:
1) ecological literacy
2) questioning and analysis skills
3) use of effective teaching methodologies
4) links to the local community
5) student decision-making and acceptance of personal responsibility
6) exploration of strategies for taking action, development of skills needed to do so
7) healthy wildlife habitat

Habitat sites offer a plethora of teaching and learning opportunities, not only for skill-building, but also for content exploration in all disciplines, including science, math, language arts/English, social studies and art. This curriculum connection is vital to the longevity of the Schoolyard Habitats project as it makes it easy for teachers to use the site regularly and incorporate it into year-round lessons.

The **Curriculum Committee** can take the lead by sharing with all faculty what they have learned about using the site through their own research and planning, either at meetings, through a newsletter or in informal lunchtime workshops. They will benefit from facilitating brainstorming sessions among colleagues, which multiplies the Schoolyard Habitats cross-curricula connections. Arranging a talk by an educator from a school with a certified Schoolyard Habitats site who has already successfully incorporated the site into their lessons, or an NWF field educator can provide guidance and inspiration. The team should stress that using the habitat site is not another thing being added to their already full curricular plates; instead the habitat should be seen as a tool with which to more effectively teach and convey the concepts

already on their agenda! Encourage teacher shadowing, so that a teacher confident teaching in the habitat can model a lesson for a more hesitant colleague.

Below is a very small sampling of the types of activities that teachers have led in their Schoolyard Habitat sites. Further help in making the habitat connection can be found in many quality curricula series, as well as on various Websites. (See Schoolyard Habitats Resources.)

Mathematics

- ◇ Measure/calculate plant growth rates and flower numbers
- ◇ Calculate the area of the habitat
- ◇ Estimate the canopy area of a tree
- ◇ Calculate cost savings from reduced maintenance of the land used as a habitat area

Social Studies

- ◇ Research past land use of the school site
- ◇ Study local Native American culture and the use of native plants as foods and medicinal herbs
- ◇ Follow local/state/national conservation policy and decision-making processes regarding wildlife conservation issues
- ◇ Establish and maintain food and herb plots

Art

- ◇ Make leaf prints
- ◇ Use plant materials for dyes and paints
- ◇ Study wildlife art and photography
- ◇ Sketch flora and fauna and create personal field guides
- ◇ Create stepping stones to be laid in the habitat site
- ◇ Create statues for display in the habitat

Science

- ◇ Study ecological concepts and biological processes such as plant distribution (native vs. non-native), food webs, and photosynthesis
- ◇ Learn about regional weather patterns affecting habitat
- ◇ Investigate microclimates influencing the animals and plants in the site
- ◇ Learn about the lifecycles of native plants and wildlife

Music

- ◇ Create musical instruments from natural items (acorn caps, grass blades, etc.)
- ◇ Listen to the sounds of nature and make seasonal recordings of the habitat sounds
- ◇ Listen to and discuss songs and other musical forms that reflect the natural world

Language Arts

- ◇ Read and analyze natural history writings from the region
- ◇ Involve students in keeping nature journals
- ◇ Write and perform a play based on student experiences and observations of wildlife in the habitat
- ◇ Illustrate language concepts and forms with examples and exercises based on habitat experiences (haiku, onomatopoeia)
- ◇ Practice writing skills through exercises related to habitat development (i.e. thank you letters, invitations, project newsletters, fundraising efforts, grant writing projects, radio and television scripts and public service announcements.

These suggestions give a few ideas of the many cross-curricular opportunities a Schoolyard Habitats project offers educators and students. Let student and educator imagination and creativity run wild! Watch the positive changes in students as they begin to learn from and in the habitat.

61

Schoolyard Habitats® Certification

Once your group has developed and implemented your Schoolyard Habitats plan, certify the project as an official Schoolyard Habitats site by the National Wildlife Federation. School communities that have created a wildlife habitat-based learning site may apply for certification by completing the application form included in this guide.

Applications will be reviewed by Schoolyard Habitats staff to see that basic criteria have been met. It isn't necessary to achieve a full-grown habitat before seeking certification. In fact, the sooner you certify your site, the sooner you will be able to reap the benefits that will help you continue the process.

When your habitat is certified, you will be sent a Certificate of Achievement from the National Wildlife Federation. Your habitat will be assigned its own unique number and it will be entered in our computer-based National Registry of Schoolyard Habitats Sites. You will also receive the quarterly Habitats newsletter and information about how to stay active in the program. An announcement about your achievement will be sent by NWF to your local news media. This national recognition will help your efforts to raise funds in the future. You will also be able to join an online discussion group of Schoolyard Habitats practitioners, access NWF resources, information and expertise, and join a dynamic network of educators nationwide.

Certification is an important milestone in what we hope will be a long journey of teaching and learning in your Schoolyard Habitats site. Habitat work is a dynamic, on-going process. After certification, we encourage you to take advantage of the living laboratory you have created by incorporating the site into your school's curriculum and instruction. The National Wildlife Federation offers professional development workshops and curricula to support the use of Schoolyard Habitats sites as teaching tools. We also recommend that you look at some of the resources we have selected in the following section to help you in your ongoing work. Lastly, remember to tap into the rich resources of fellow educators involved in habitat work – participate in our Schoolyard Habitats Practitioner's listserv, develop partnerships with local organizations, and network with other certified sites in your region. Together, we can strengthen and support our important efforts to create and restore wildlife habitat, and to use wildlife habitat as an effective teaching tool.

Thank you for your interest and participation!

62

schoolyard habitats® Application for Certification

School/Learning Center Name _____

Principal/Director _____

Contact Name (if different) _____

Address _____

City _____

State/Province _____ County _____ Zip/Postal Code _____

School Telephone _____ Contact Telephone (if different) _____

Fax _____ Contact E-mail Address _____

Office Use:
Habitat # _____
Date Received _____
Certified _____
C.S. _____
Key Words _____
Source Code _____

Would you like to be added to the Schoolyard Habitats listserv? ☐ *Yes* ☐ *No*

School Website Address _____ *Does your website feature your SYH project?* ☐ *Yes* ☐ *No*

Would you like your Schoolyard Habitats site featured on the NWF website? ☐ *Yes* ☐ *No*

Grade Level(s) Served by School/Learning Center: _____

Ages of Students Actively Involved in SYH Project: _____

Size (Sq. Ft. or Acres) of SYH Project Site: _____

How did you hear about the Schoolyard Habitats program? _____

A Schoolyard Habitats project can be an incredible addition to your school campus and local community for many years to come. After reading the Schoolyard Habitats Planning Guide, please complete all five sections of this application, showing the steps you have taken to create the habitat area and how it is used as a learning site. Incomplete applications may not be accepted. For assistance with the application, contact the SYH Program Staff at wildlife@nwf.org or call 1-800-822-9919.

I) Project Description/Goals

Please briefly describe current projects and future goals for the Schoolyard Habitats site. Include the process that occurred during the development of your habitat and the educational objectives of this project.

BEST COPY AVAILABLE

II) Habitat Team Structure

The team should represent a variety of people (i.e. not all team members should be teachers). List the key participants involved with the habitat project and the segment of the school community they represent.

Team Member Name:	Representing:

III) Habitat Components

Locally native plants provide the widest range of seasonal habitat benefits to wildlife. If we want not only to attract wildlife, but to help restore the diversity of our local ecosystems, we must bring back our locally native plants. The National Wildlife Federation strongly encourages the use of native plants.

A. FOOD: *Plantings and Feeders*

Food is best provided for wildlife naturally (nuts, nectar, berries, pollen, and buds). The best source of naturally occurring food is found in plants native to your region. Care should also be taken to provide year-round food sources for local wildlife. Briefly list the food available for wildlife at your site, if it is provided naturally or as a supplement, and if it is provided through native plants. Discovering which plants are native is an important part of the learning process in Schoolyard Habitats work. If you are unsure whether the plants on your schoolyard are native, involve your students and Habitat Team in research to find out!

Food Type:	Provided By:	Visited By:	This plant is native: Yes	No
ex: berries	*Cotoneaster*	*Hermit Thrushes, Robins, & Bluebirds*	☒	☐
			☐	☐
			☐	☐
			☐	☐
			☐	☐
			☐	☐

B. WATER: *Drinking, Bathing*

Wildlife needs water daily and throughout the year. An elevated birdbath may protect birds from cats and other predators, while a shallow, wide-rimmed dish will provide water for small animals when placed on the ground near shrubbery or other cover. A small pond set into the ground can provide not only water for drinking and bathing, but cover and reproductive areas for small fish, frogs, insects and reptiles.

We provide water: ☐ Throughout the Year ☐ Seasonally

We provide water in: ☐ Bird Bath ☐ Pond
☐ Spring ☐ Water Garden
☐ Water Dripping into a Bird Bath ☐ Stream
☐ Other (describe): _____

BEST COPY AVAILABLE

C. COVER: *Places to Hide*

The ideal wildlife habitat area will include plants ranging in size and density from evergreen ground cover to tall, mature trees. This variety of plant life will assist a range of animals in selecting the appropriate cover they need for feeding, hiding, courting and nesting. Hollow logs, brush piles, and stone walls can add to the range of cover you provide.

We provide cover for wildlife in the following manner:

Deciduous Shrubs/Trees:	Number	Evergreen Shrubs/Trees:	Number:

☐ Brush Piles ☐ Log Piles ☐ Rock Piles/Walls ☐ Ground Covers

☐ Meadow, Scrub, or Prairie Patch ☐ Other (describe): _____

_____

D. PLACES TO RAISE YOUNG

A more specific kind of cover is needed to make your wildlife habitat complete. These are areas for courtship and for nurturing young animals and include safe areas for nests, specific plants upon which butterfly caterpillars depend, and the shallow water security that tadpoles find in a pond.

We provide the following for nesting birds, denning mammals, egg-laying reptiles and amphibians, fish, butterflies, and other insects and invertebrates:

Large Trees:	Small Trees:	Shrub Masses:

☐ Trees with Nest/Den Cavities ☐ Dens in Ground/Rock

☐ Water Garden/Pond ☐ Nesting Boxes

☐ Nesting Shelves ☐ Meadow, Prairie, or Scrub Patch

☐ Other (describe): _____

_____

IV) Site Diagram and Project Documentation

Please enclose a sketch or landscape design on 8.5" x 11" paper to visually explain the components of your Schoolyard Habitats site. Please make note of which elements are currently in place, and which will be added in the future. Indicate any features created to make the habitat accessible to students with disabilities (i.e. pathways, raised planting beds, etc.). We are unable to return all materials; please keep a duplicate copy for your records.

We encourage you to send before and after photos of your Schoolyard Habitats site, as well as photos which demonstrate student and community involvement with the project. Please label all photos with your school name, city, state, and approximate dates when the photos were taken. All photos must be accompanied by a release form. Please download a copy of the release form from our website (or contact our office to request a copy if you plan to include photos with your application). We are unable to return materials sent to us, so please be sure to keep duplicates for your records.

V) Widening the Classroom Walls: *Curriculum Use*

Please submit additional pages as needed.

A. Describe how you are using your Schoolyard Habitats site for cross-curriculum learning. How do you meet state/local benchmarks and standards of learning through use of your habitat site?

B. How many teachers at your school are currently using the Schoolyard Habitats site as an educational tool?

C. What steps have you taken or do you plan to take in order to increase the usage (by students and teachers) of your Schoolyard Habitats site?

D. Have educators at your school written up lessons or curriculum for use in the Schoolyard Habitats site or to accompany the project? Please describe.

E. What resources have been helpful in the planning and instructional use of your Schoolyard Habitats project (e.g., Project Wild, Project Learning Tree, NAAEE's VINE program)?

F. What other types of resources would be useful to the future development and use of your Schoolyard Habitats site?

VI) Maintenance

Briefly describe your maintenance plan, both during the school year, as well as during the summer months.

***Thank you* for your interest and participation in the Schoolyard Habitats Program.**
Please:

- Allow 6-8 weeks for processing of the application.
- Be sure to save copies of all materials you submit as they will not be returned.
- **Please submit this application with the $15 Program Enrollment Fee to cover our processing and handling costs.**
- If submitting photos, please enclose a photo release form (see IV. Site Diagram and Project Documentation).
- All submissions must be sent together in one 9" x 12" envelope.

Please send your submission to:

Schoolyard Habitats Program
National Wildlife Federation
11100 Wildlife Center Dr.
Reston, VA 20190-5362

NATIONAL WILDLIFE FEDERATION®
www.nwf.org™

Questions? Call us at 1-800-822-9919 or 703-438-6000 • World Wide Web http://www.nwf.org/habitats/schoolyard

printed with soy inks on recycled-content recycled paper with 100% post-consumer waste

BEST COPY AVAILABLE

Schoolyard Habitats Resource Guide

National Wildlife Federation

The list below highlights helpful references for Schoolyard Habitats projects. In addition to this listing, resource listings — including books, newsletters, videos,World Wide Web Home Page addresses, resource agencies and organizations — are updated on a regular basis on the NWF Schoolyard Habitats website. Visit us at www.nwf.org for additional information.

NWF Resources

National Wildlife Federation's Schoolyard Habitats® Program
http://www.nwf.org/schoolyardhabitats
Information on creating a wildlife habitat on your school grounds, and certifying your habitat as an official Schoolyard Habitats site. Also offers professional development workshops on: Creating Schoolyard Habitats, Access Nature, Habitats, Wetlands, Grasslands, Northern Forests, Endangered Species, and more.

Habitats
Free newsletter for certified Schoolyard Habitats published by the National Wildlife Federation. Showcases habitat projects and features articles and ideas relevant to both Schoolyard and Backyard Wildlife Habitats.

The National Wildlife Federation's Schoolyard Habitats® Listserv
The Schoolyard Habitats listserv allows individuals interested in the creation and use of habitats on school grounds to share ideas. Participants include environmental education experts, resource professionals, teachers, parents, and individuals interested in using the outdoors as a teaching tool. If you would like to be added to this list, send a blank email to syh-exchange-subscribe@igc.topica.com.

National Wildlife Federation **NatureScope Kits**
Classroom resources helping educators introduce environmental issues. Available for the following topics: Habitats, Northern Forest, Grasslands, Endangered Species and more.

National Wildlife Federation. **Ranger Rick.**
Monthly nature magazine for use by grades 4-6. To order: 1-800-611-1599.

National Wildlife Federation. **Ranger Rick's NatureScope.**
Designed to help K-8 educators incorporate science and environmental education into their teaching through creative activities. Titles include: Amazing Mammals, Part II, Astronomy Adventures, Birds, Birds, Birds, Digging into Dinosaurs, Discovering Deserts, Diving into Oceans, Endangered Species: Wild and Rare, Geology: the Active Earth, Incredible Insects, Let's Hear it for Herps, Pollution: Problems and Solutions, Rain Forests: Tropical Treasures, Trees are Terrific, Wading into Wetlands, Wild About Weather, Wild and Crafty

BEST COPY AVAILABLE

Schoolyard/School Garden-Specific Curriculum

National Wildlife Federation. **Your Big Backyard.**
Monthly nature magazine for use by grades K-3. To order: 1-800-611-1599.

Chedzoy, Sue. **Physical Education in the School Grounds.**
1993. Learning Through Landscapes
Provides outdoor activities for K-6 that go beyond typical PE curriculum.

Dean, Jacqui. **History in the School Grounds.**
1993. Learning Through Landscapes.
Outdoor activities for K-6 that help students gain a better understanding of history and their school's past.

Hare, R., C. Attenborough, and T. Day. **Geography in the School Grounds.**
1993. Learning Through Landscapes.
Outdoor activities for K-6 focusing on geography skills, such as map making, the use of photographs and models, water and land forms, and environmental quality.

Jurenka, Nancy Allen. **Beyond the Bean Seed: Gardening Activities for Grades K-6.**
1996.
Hands-on activities which integrate gardening and language arts.

Keaney, Brian. **Arts in the School Grounds.**
1993. Learning Through Landscapes.
Numerous creative outdoor art, drama, design, music, and dance activities for K-6.

Keaney, Brian. **English in the School Grounds.**
1993. Learning Through Landscapes.
Activities for K-6 designed to teach students writing, reading, listening, and speaking.

Kiefer, Joseph and Martin Kemple. **Digging Deeper: Integrating Youth Gardens Into Schools & Communities.**
1998. Food Works and Common Roots Press.
Takes you step by step through the entire process of creating a garden for educational purposes on school grounds. While the focus of the book is vegetable gardens, the information and specific examples are applicable for any type of school garden project.

Life Lab. **The Growing Classroom: Garden-Based Science, Grades 2-6.**
1990. Life Lab: Santa Cruz, CA.
Resource for teaching math, reading, and nutrition skills. Provides experiments, fun games, and pictures that make learning fun.

Ocone, Lynn and Eve Pranis. **National Gardening Association Guide to Kids' Gardening.**
1990. John Wiley and Sons, Inc.
Information on how to start gardening projects with kids, including a section on garden activities.

Ocone, Lynn and Eve Pranis. **GrowLab: Activities for Growing Minds.**
1990. National Gardening Association.
Creative plant-related activities for grades K-8.

Rhydderch-Evans, Zoe. **Mathematics in the School Grounds.**
1993. Learning Through Landscapes.
Activities for K-6 divided into sections on numbers, measurement, space and shape, and data work.

Russell, Helen Ross. **Ten Minute Field Trips.**
1990. National Science Teachers Association.
Hands-on learning K-6 activities to do on school grounds with or without a school garden or wildlife habitat.

Sobel, David. **Mapmaking with Children: Sense of Place Education for the Elementary Years.**
1998. Heinemann Press.
Provides a developmental perspective on children's understanding of maps, and gives concrete examples of developmentally appropriate mapmaking activities for children ages 5-12. Activities foster students' development of a sense of place, beginning with their own yards and communities.

Thomas, Gill. **Science in the School Grounds.**
1993. Learning Through Landscapes.
Activities for K-6 focusing on ponds, trees, grassy areas, wildflowers, waste-management, mini-beasts, weather, and the built environment.

Magazines / Newsletters

Green Teacher
Fifty page quarterly magazine that provides environmental information and activities for educators of grades K-12. 916-960-1244 www.greenteacher.com/

Environmental Education Activities

Cornell, Joseph. **Journey to the Heart of Nature: A Guided Exploration.**
1995. Dawn Publications.

Cornell, Joseph. **Sharing Nature with Children.**
176p. 1998. Dawn Publications.
Provides activities and insight on ways to involve kids with the outside world.

Cornell, Joseph. **Sharing the Joy of Nature: Nature Activities for All Ages.** 1989. Dawn Publications.

Environment & Education. Habitat and Biodiversity: Teacher Resource Guide.
1998. Dale Seymour Publications.
Activities which use the school grounds as a research laboratory for grades K-12. Topics covered are biodiversity, landscape management, xeriscaping, composting, and integrated pest management.

Hogan, Kathleen. **EcoInquiry: A Guide to Ecological Learning Experiences for the Upper Elementary/Middle Grades.**
1994. Kendall Hunt.

Hunken, Jorie. **Ecology for All Ages: Discovering Nature Through Activities for Children and Adults.**
1994. Globe Pequot Press.

Lingelbach, Jenepher and Purcell, Lisa, eds. **Hands-On Nature: Information and Activities for Exploring the Environment with Children.**
2000. Vermont Institute of Natural Science.
Well organized and effective nature-based activities.

Parella, Deborah. **Project Seasons: Hand-on Activities for Discovering the Wonders of the World.**
Shelburne Farms.
Elementary activities focused on science through the seasons.

Roberts, Janet Weir and Carol Huelbig. **City Kids and City Critters: Activities for Urban Explorers.**
1996. Learning Tiger Press, McGraw Hill.

The American Forest Foundation. **Project Learning Tree: Environmental Education.**
1996. Pre K-8 Activity Guide.

Tilgner, Linda. **Let's Grow! 72 Gardening Adventures with Children.**
1988. Story Communications.

Council for Environmental Education. **Project WILD K-12 Activity Guide.**
2000.

WOW! The Wonders of Wetlands: An Educator's Guide.
1995.
Background information and 50 activities for grades K-12. Special appendix on creating a schoolyard wetland habitat.

Landscaping for Wildlife

California Center for Wildlife Staff. **Living With Wildlife.**
1994. Sierra Club Books.
Describes more than 100 North American wildlife species and their interactions with humans. Provides advice on how to care for wildlife in distress, prevent human-wildlife conflicts, and deal with problems in a humane manner.

Druse, Ken and Margaret Roach. **The Natural Habitat Garden.**
1994. Crown Publishing Group.
Information on how to create a beautiful, wildlife-friendly landscape using native plants. Covers many different types of ecosystems (grasslands, drylands, wetlands, woodlands, etc.) and has numerous full color pictures of the recommended plants.

Henderson, Carroll. **Landscaping for Wildlife.**
1994. Minnesota Dept. of Natural Resources.
Guide, reference, and resource book for creating natural landscaping that support wildlife.

Marinelli, Janet, ed. **The Environmental Gardener.**
1992. Brooklyn Botanic Garden, Inc.

Schneck, Marcus. **Your Backyard Wildlife Garden.**
1992. Rodale Press.

Stein, Sara. **Noah's Garden: Restoring the Ecology of Our Own Backyards.**
1993. Boston: Houghton Mifflin.
Inspiring story of the author's experience of transforming her conventional yard into a wildlife haven. Provides practical information on the way ecosystems works.

Wyzga, Marilyn C. **Homes for Wildlife: A Planning Guide for Habitat Enhancement on School Grounds.**
1998.
New Hampshire Fish and Game Department. Excellent step-by-step guide for creating a schoolyard wildlife habitat and integrating it into the curriculum. Geared toward K-8 teachers. Available through the Acorn Naturalist 1-800-422-8886

Accessible Landscaping

Greenstein, Doreen. **Backyards and Butterflies: Ways to Include Children with Disabilities in Outdoor Activities.**
1993. New York State Rural Health and Safety Council.

Rothert, Gene. **Enabling Gardens: Creating Barrier-Free Gardens.**
1994. Dallas, TX: Taylor Publishing Company.
Information and techniques on how to make a garden accessible for individuals with mobile, visual and other impairments.

Landscaping for Children

Learning Through Landscapes. **The Challenge of the Urban School Site.**
1996.
Instruction and inspiration for creating successful outdoor learning areas at urban schools. Offers practical advice on multi-cultural issues, making use of limited space, seating, shelter, arts, vandalism, and removing asphalt.

Moore, Robin C. **Plants for Play: A Plant Selection Guide for Children's Outdoor Environments.**
1993. MIG Communications.
Offers suggestions on plants that have educational value and are safe for children.

Moore, Robin C. And Herb H. Wong. **Natural Learning: Creating Environments for Rediscovering Nature's Way of Teaching.**
1997. MIG Communications.
Uses a specific school as a case study to guide teachers, administrators, designers, and parents through naturalizing a schoolyard and integrating it into the curriculum.

Schiff, Paul and Dr. Cindi Smith-Walters. **WILD School Sites: A Guide to Preparing for Habitat Improvement Projects on School Grounds.**
1994. Project WILD.

Stine, Sharon. **Landscapes for Learning: Creating Outdoor Environments for Children and Youth.**
1997. John Wiley & Sons, Inc.
Provides useful information on what makes a schoolyard habitat successful using 11 case studies and numerous photos and drawings. Also outlines essential elements for any play environment.

Titman, Wendy. **Special Places, Special People: The Hidden Curriculum of School Grounds. 1994. Learning Through Landscapes.**

Wood, Joan and Michael Littlewood. **A Guide to the Management and Maintenance of School Grounds.**
1996. Learning Through Landscapes.

Native Plants

Beaubaire, Nancy, ed. **Native Perennials: North American Beauties.**
1996. Brooklyn Botanic Gardens, Inc.
Information on how to include native plants in your garden design and how care for them. Also provides lists of native wildflowers suppliers.

Marinelli, Janet, ed. **Going Native: Biodiversity in Our Own Backyards.**
1994. Brooklyn Botanic Gardens.
Suggests native plants to use in your landscape and the benefits of doing so.

Sawyers, Claire, ed. **Gardening with Wildflowers and Native Plants.**
1990. Brooklyn Botanic Gardens.
Suggests native plants and wildflowers for an attractive wildlife-friendly landscape.

Wilson, William H. **Landscaping with Wildflowers and Native Plants.**
1985. Ortho Information Services.
Information on how to design and create prairies, meadows, alpine, and desert gardens. Also suggests where to find native plants and seeds.

Composting

Appelhof, Mary. **Worms Eat My Garbage: How To Set Up and Maintain a Worm Composting System.**
1982. Flowerfield Enterprises.

Martin, Deborah L. and Grace Gershuny, eds. **The Rodale Book of Composting.** 1992. Rodale Press.
Complete information on composting including: history, benefits, methods, equipment, and how-to information.

Soils

Bowles, John Paul, ed. **Soils.**
1990. Brooklyn Botanic Garden, Inc.
Information on the properties of soil, plant requirements for soil, how to test your soil, how to improve your soil, and much more.

Water Gardens

Burrell, C. Colston, ed. **The Natural Water Garden: Pools, Ponds, Marshes & Bogs for Backyards Everywhere.**
1997. Brooklyn Botanic Garden, Inc.
Helps you select the best type of water garden and plants for your site and region. Offers step-by-step instruction for designing, creating, and installing ponds, marshes, and bogs.

Pest Management

Olkowski, William, Sheila Daar, and Helga Olkowski. **Common-Sense Pest Control.**
1991. Taunto Press.
Offers proven, practical solutions to pest problems that use physical, mechanical, cultural, and biological control rather than chemicals.

Schultz, Warren, ed. **Natural Insect Control: The Ecological Gardener's Guide to Foiling Pests.**
1994. Brooklyn Botanic Garden, Inc.
Information on how to tell good insects from bad insects, how to control pests naturally, and much more.

Attracting Specific Wildlife

Bats

Tuttle, Merlin D. **America's Neighborhood Bats.**
104p. 1988. University of Texas Press.
Behavior and biology of bats, including color photos and range maps.

Tuttle, Merlin D. and Donna L. Hensley. **The Bat House Builder's Handbook.** 34p. 1993.
Bat Conservation International. Excellent information on bats and bat houses. Contains the results of years of research on size, color and placement of bat houses. Also included is information on how to participate in ongoing bat research through membership in Bat Conservation International (application card included).

Birds

Dennis, John. **The Complete Guide to Bird Feeding.**
1994. Alfred A. Knopf.
Information on what birds to expect when and how to choose the right bird feeder and stock it with the most suitable bird feed.

Halpin, Anne. **For the Birds!**
1996. Henry Holt.

Harrison, George H. **Garden Birds of America.**
1996. Willow Creek Press.
Information on how to attract birds, including suggestions on what to plant, feeders and food, and size and placement of birdhouses. Color photos of 60 popular garden bird species, with information on their ranges, and natural history.

Kress, Stephen W. **The Bird Garden.**
1995. Dorling Kindersley.
Comprehensive guide to attracting birds to your yard or school year round using bird feeders and recommended plants.

McKinley, Michael and John Dennis. **How to Attract Birds.**
1995. Ortho Information Services.
How-to information on attracting birds by providing food, water, shelter, and nesting sites.

Butterflies and Hummingbirds

Dennis, John and Matthew Tekulsky. **How to Attract Hummingbirds and Butterflies.**
1990. Ortho Information Services.
Provides plant selection lists and necessary design elements for the most common species of hummingbirds and butterflies.

Pyle, Robert J. **Audubon Society Handbook for Butterfly Watchers.**
1984. Charles Scribners Sons.
Practical field advice, including what to wear, equipment to carry, identification chart, and more.

BEST COPY AVAILABLE

Stokes, Donald W. and Lillian Q. Stokes. **The Hummingbird Book.**
1989. Little, Brown and Co.
Information on how to attract and identify hummingbirds.

Xerces Society Staff. **Butterfly Gardening.**
1990. Sierra Club Books.
Information on how to create a butterfly habitat, overview of the life cycle of butterflies and moths, regional lists and pictures of the most common North American butterflies and moths, and much more.

Habitat Restoration

Chesky, Edward D. **Habitat Restoration: A Guide for Proactive Schools.**
1993. Waterloo County Board of Education.

Firehook, Karen and Jacqueline Doherty. **A Citizen's Streambank Restoration Handbook.**
1995. Izaak Walton League of America (Save Our Streams).

Riley, Ann L. **Restoring Streams in Cities: A Guide for Planners, Policymakers and Citizens.**
1997. Island Press.
Presents land use planning, site design, and watershed restoration techniques that can be used to restore urban streams.

School Greening

Chase, Jayni and Thomas E. Lovejoy. **Blueprint for a Green School.**
1995. Scholastic Inc.
Very complete guidebook on environmental issues and school grounds. Includes an extensive resource list.

Field Guides

The Peterson Series Field Guides; ***over 55 titles, covering North America.*** Houghton Mifflin.

The Audubon Society Nature Guides; ***series which focuses on ecosystems and habitat types.***
Alfred A. Knopf.

The Stokes Nature Guides; ***including three volumes of Guide to Bird Behavior.*** Little, Brown, and Co.

Children's Books

There are thousands of excellent children's books written about plants, animals and the environment. These are a few of the most relevant: how-to habitat guides for children, books that involve children starting successful gardening projects in their neighborhoods, and books in which children are discovering wildlife where they live.

Bash, Barbara. **Urban Roosts: Where Birds Nest in the City.**
San Francisco: Little Brown and Company, 1990.
Informative book on urban wildlife for readers ages 9-12.

Bunting, Eve. **Secret Place.**
New York: Clarion Books, 1996.
Story of young boy's discovery wildlife in the city.

Herberman, Ethan. **The City Kid's Field Guide.**
New York: Simon and Schuster. 1989.
Educational information geared towards kids on the types of wildlife found in the city and how they survive.

Fleischman, Paul. **Seedfolks.**
New York: Harper Collins, 1997.
Short novel for middle school students; 9 year-old girl starts a community garden and brings together her diverse neighborhood and their stories.

Perenyi, Constance. **Growing Wild: Inviting Wildlife Into Your Yard.**
Hillsboro, OR: Beyond Words Publishing, Inc., 1991.
Wildlife habitat creation how-to guide for kids.

Tamar, Erika. **The Garden of Happiness.**
San Diego, Harcourt Brace and Co., 1996.
Mariso, the main character, works with her neighbors to transform a garbage-filled lot in their inner city neighborhood into a community garden. Recommended for readers age 4-8.

Thornhill, Jan. **Wild in the City.**
San Francisco: Sierra Club Books for Children, 1995.
Jenny and her mother are surprised to discover all the wild creatures that are living in their urban yard. At the end of the story are details about the animals in the book, as well as hints about how to find clues to their presence in your own neighborhood. Recommended for readers age 4-8.

Fundraising and Grant Resources

The organizations below have been selected because of their support of environmental projects that involve youth by providing funding and materials for educators throughout the U.S. For further specifics, contact the organizations directly. For more information on region-specific grant sources, see the Schoolyard Habitats Program website: www.nwf.org/schoolyardhabitats.

National Wildlife Federation's Schoolyard Habitats Program Mini-Grants:
Each year, Schoolyard Habitats Program offers $250.00 mini-grants to schools in the early stages of their Schoolyard Habitats projects. Applications become available in October and are due on January 15th. Visit our website (www.nwf.org/schoolyardhabitats) for details and to download the application.

Human-I-Tees Fundraisers
400 Columbus Avenue, Valhalla, NY 10595 180098-EARTH
www.humanitees.com
Provides free shipping and low-cost environmental products for school fundraisers.

National Tree Trust
Community Tree Planting Program, 1120 G St. NW, Suite 770,
Washington, DC 20005 1-800-846-8733 www.nationaltreetrust.org
Public schools can apply to receive free tree seedlings through NTT's Community Tree Planting program. Containers and monetary soil subsidies are also available.

Environmental Protection Agency (EPA)
Headquarters Office of Environmental Education, 1200 Pennsylvania Ave. NW,
1704, Washington D.C. 20460 (202) 260-4965
www.epa.gov/enviroed/grants.html/
Applications are due in November, and announced the following summer. Grants of up to $25,000 are available.

Foundation for the Improvement of Education
1201 16th St., NW
Washington, D.C. 20036
www.nfie.org/grants.htm
Grants provide opportunities for teachers, education support professionals, and higher education faculty to engage in high quality learning and leadership experiences, or innovations benefiting student achievement. Three hundred $1000 - $3000 grants are awarded each year. Application available online.

National Environmental Education and Training Foundation
1707 H St., NW, Suite 900, Washington D.C. 20009 (202)833-2933
www.neetf.org
NEETF issues challenge grants of $5000-$40,000 in three categories: Health and Environment; Safe Water; and Environmental Education Excellence.

National Gardening Association – *Youth Garden Grants*
1100 Dorset St., South Burlington, VT 05403 1 800 538-7476 x205
http://www.kidsgardening.com/grants.asp/
Four hundred grants of quality tools, seeds and garden products, (valued at $750) are available each year. To be eligible groups must plan to garden with at least 15 children between the ages of 3-18.

Sea World/Busch Gardens Environmental Education Awards
Education Department, 7007 Sea World Drive, Orlando, FL 32832
1-877-792-4332 www.seaworld.org/EEAwards/eea01.htm
Because this is an awards program, applicants must be able to demonstrate significant accomplishments by the time of their application. Eight $10,000 grants are awarded to schools, and one $5000 grant is awarded to a teacher each year. K-12 schools in the U.S. and Canada are eligible to apply.

Toyota TAPESTRY Grants for Teachers
c/o National Science Teachers Association, 1840 Wilson Boulevard,
Arlington, VA 22201 www.nsta.org/programs/tapestry/index.htm
This grant is available to elementary teachers who do some science in their classrooms, and to middle and high school teachers who spend at least 50% of their time teaching science. Grants are given to innovative projects that enhance science education in the school and/or school district.

Fundraising Reference Guides

Environmental Grantmaking Foundations Directory
P.O. Box 22770, Rochester, NY,
14692-2770, 1 800 724-1874

The Foundation Center
79 5th Ave., New York, NY 10003 (212) 620-4230 www.fdncenter.org/
Their website includes a weekly "Philanthropy News Digest," and online fundraising library, a searchable database of funding opportunities, and online training about grant seeking and proposal writing.

Online Resources

Habitat Creation

Wild Ones Landscapers
http://www.for-wild.org/
Site is dedicated to the importance of landscaping with native plants. Includes an excellent "how-to" handbook that guides you through the creation of native plant

landscapes and habitat for wildlife.

Sources of Materials

Gardens for Growing People
http://www.svn.net/growpepl/
Catalog for ordering child-sized tools, books, curriculum, and much more. The site also offers tips for gardening with children and a free newsletter.

Learning Through Landscapes
http://www.ltl.org.uk/
A UK based program that promotes thoughtful design and use of school grounds. A source for a high quality schoolyard curriculum series (i.e. English in the School Grounds, Math in the School Grounds) as well as guidebooks addressing specific issues, such as seating, maintenance, and fundraising.

Curriculum and Activities

The National Gardening Association's Kids Gardening Page
http://www.kidsgardening.com/
Great information for teachers and parents on gardening projects to do with children. Site contains a wealth of information, including recommended books for children and adults, grant opportunities, key word curriculum search, and a free online newsletter.

The Wild Ones
http://www.thewildones.org/
International program that offers curriculum ideas, resource lists, free newsletters, information on research projects that classrooms can join, and much more. Site is also available in Spanish and Portuguese.

Classroom Projects

Journey North
http://www.learner.org/jnorth/
Free online program through which classrooms can track the spring migration of various animal species. Students share their information with other classrooms across the hemisphere and work directly with scientists. The site also provides lesson ideas and a forum for online teacher discussions.

Classroom Feeder Watch
http://birdsource.cornell.edu/cfw/
Great program run by Cornell University that allows classrooms to participate in ongoing ornithology research projects. Includes curriculum ideas and National Science Education Standards links.

Monarch Watch
http://www.monarchwatch.org/
Site has a great deal of information related to teaching about monarchs in the classroom. Included on the site are details on the monarch life cycle, instructions on how to rear monarchs and grow milkweed, and opportunities for students to participate in research projects with scientists.

Plants and Wildlife

American Horticultural Society
http://www.ahs.org/
Plant related information and links to a national list of children's gardens (under the Gardening Connections section).

The Lady Bird Johnson Wildflower Center
http://www.wildflower.org/
Regional native plant lists, as well as educator kits, which contain plant information and posters for use in the classroom, can be purchased on the site.

Species 2000
http://www.sp2000.org/
Great starting point for learning about specific plant and animal species. Includes in-depth information and a variety of helpful web links.

Butterflies of North America
http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/bflyusa.htm
Excellent source of region-specific information about butterflies, complete with county checklists, distribution maps and photos.

Bat Conservation International
http://www.batcon.org/
Provides information on bats, building bat houses, and ordering bat-related educators' guides.

Environmental Education Clearinghouses

Environmental Literacy Council
http://www.cee-anc.org/
Comprehensive information and valuable links on key environmental issues. Also includes reviews of advanced placement environmental science text books.

The Center for Environmental Education
http://www.ceeanc.org/
Contains a searchable database of environmental education programs. Helpful source of topic-specific curriculum and articles and provides curriculum evaluations.

EE-Link
http://eelink.net/
Offers links to many websites, including sites on curriculum ideas, grant opportunities, and environmental education publications.

ERIC Clearing House for Environmental Education
http://www.ericse.org/eeindex.html
Information on environment-focused books, conferences, lesson plans, journals, and web sites.

Garden Supply Resources

Acorn Naturalist
17821 East 17th St., #103
PO Box 2423
Tustin, CA 92781-2423
Resources and curricula for the trail and classroom.

Applewood Seed Company
5380 Vivian Street
Arvada, CO 80002
Phone: (303) 431-6283 Fax: (303) 431-7981
Children's gardening products.

Arbour Recycled Products
800 Bank Street
Ottawa, Ontario K1S3V8
Phone: (613) 567-3168 Fax: (317) 567-3568
Vermicomposting (composting with worms) 25-minute video.

Banana Slug String Band
390 Big Creek Road
Davenport, CA 95017
Phone: (408) 429-9806
Cassette tapes and video with sing-along songs about gardening and the environment.

Botanic Garden Seed Company
225 Fifth Avenue #617
New York, NY 10010
Phone: (212) 679-6015
Seeds and line of supplies for children.

Burpee Seed Co's Grow America
www.burpee.com
W. Atlee Burpee Company
300 Park Avenue
Warminster, Pa 18974
Phone: 215-674-4900 or 800-888-1447 Fax: 215-674-8402
Seeds and gardening supplies, seed planting campaign for children, free press kit.

Clyde Robin Seed Company
www.clyderobin.com/
3670 Enterprise Avenue
Hawyard, CA 94545
Phone: (510) 785-0425
Wildflower seeds.

The Cook's Garden
www.cooksgarden.com
P. O. Box 535
Londonberry, VT 05148
Phone: 802-824-3400 Fax: 802-824-3027
Seeds, plants and organic gardening supplies.
Emphasis on family gardening.

Garbage Bag Gardens
1711 Stockton Hill Road, No. 310
Kingman, AZ 86401
Phone: (602) 757-4762
Plastic garbage bag containers for growing plants in classrooms and outdoor areas. Posters.

Gardeners' Supply Company
www.gardeners.com/gardeners
128 Intervale Road
Burlington, VT 05401-2850
Phone: 802-863-1700
Child-sized gardening tools.

Gardens for Growing People
http://www.svn.net/growpepl/
P. O. Box 630
Point Reyes, CA 94956
Phone: (415) 663-9433 E-mail: GrowPepl@svn.net
Garden supply catalog/newsletter.

Granite Seed
1697 West 2100 North
P. O. Box 177
Lehi, UT 84042
Phone (801) 768-4422 or (801) 531-1456

Grass seeds, shrubs, reclamation plants.

Heritage Gifts, Inc.
1203 Spring Street
Latrobe, PA 15650
Phone: (412) 537-0878 or (800) 597-2275 Fax: (412) 539-2298
Garden gifts, including Bark Buddy plush tree with seed kit.

Jackson and Perkins
http://www.jacksonandperkins.com
1 Rose Lane Dept. 7274
Medford, OR 97501
Offers a nice selection of miniature roses for growing indoors plus basic rose and perennial care basics.

Jonny's Selected Seeds
www.johnnyseeds.com
Foss Hill Road
Albion, ME 04910
Phone: 207-437-9294 Fax: 207-437-2165
Vegetable, flower and herb seeds, books and supplies. Educational group discounts.

Lets Get Growing
www.letsgetgrowing.com
1900 B Commercial Way
Santa Cruz, CA 95065
Phone: 408-464-1868 Fax: 408-476-1427
Complete selection of children's gardening curriculums; tools and indoor gardening projects.

Northrup-King Lawn and Garden
7500 Olson Memorial Highway
Golder Valley, MN 55427
Phone: (612) 593-7265
Child-sized garden tools, garden supplies.

Shepherd's Seeds
www.whiteflowerfarm.com
30 Irene Street
Torrington, CT 06790
Phone: 203-482-3638
Online catalog with over 500 seed varieties including a line of children's garden seeds. Reference library with a number of basic growing guides.

87

Stokes Seeds
http://www.stokeseeds.com
Box 548
Buffalo, NY 14240-0548
Phone: 716-645-9649
Stokes Seed Company has been around for over 115 years. Stokes has one of the best selections of vegetable seeds available at a good price. This site also includes a plant hardiness zone map and gardening links.

Territorial Seed Company
www.territorial-seed.com/
P. O. Box 157
Cottage Grove, Oregon 97424-0061
Phone: 541-942-9547
Good online selection of vegetable, flower and herb seeds

Van Bourgaondien & Sons, Inc.
www.dutchbulbs.com
P. O. Box 1000
Babylon, NY 11702
Great selection of high quality bulbs and perennials.

Virginia Berry Farm
P. O. Box 4
Ruther Glen, VA 22546
Phone: (804) 448-4430
Blueberry poster.

Wee Share International
P. O. Box 1028
Pagosa Springs, CO 81147
Phone: (800) 874-2733
Wee Sprouts Salad Kit.

Wild Birds Unlimited
Headquarters:
11711 N. College Ave., Suite 146
Carmel, IN 46032-5655
Phone: (888) 302-2473 FAX: (317) 571-7110

Schoolyard Habitats® Accessibility Guidelines

When creating a Schoolyard Habitats site it is important to consider the needs of people as well as wildlife, including people with disabilities. When possible, add accessible elements to the habitat design that will enhance the usability of the space for all people (i.e. people with disabilities, senior citizens, parents with strollers, etc.).

Of course, the size and location of the habitat area and budget will determine what accessible elements are reasonable to include in the site. The following items are low-cost and easily implemented suggestions. If there is no way to include these in the original design, consider adding more accessible elements into the long-range plan for the wildlife habitat site.

Note: If the habitat site is developed at a public or government facility or the project funding comes from federal, state or local government sources, the site must be accessible according to the Americans With Disabilities Act requirements. Please contact the United States Access Board at www.access-board.gov for additional accessibility guidelines.

Location

- Choose a site that is largely accessible (i.e., level, easy to get to, does not flood, etc.).
- Place the habitat close to a building.
- Take advantage of existing paths or sidewalks for access.
- Choose a site that is close to a water source for ease of maintenance.

Pathways

- Width: Optimal recommended width is 60 inches with a minimum recommended width of 48 inches.
- Surface: Should be firm and stable. Recommended surface options include pavement, textured concrete and screenings. Screenings are made from a mixture of small pieces of rock (no greater than 1/4 inch in size; typically limestone or greenstone) and dust to stabilize it. Brick and boardwalk style pathways become slick when wet and can be a safety risk. Rock, wood chip and stepping stone paths are not recommended.

◇ Slope: Recommended 5 percent or less running slope (grade). Recommended cross slope is 2 to 3 percent.

◇ Ramps: Any time the grade of a path exceeds 5 percent, provide a ramp. If a ramp is needed, the least amount of slope possible is recommended. A maximum acceptable slope is 1:12 (e.g., a one-inch rise for every twelve inches of distance). Ramps are required to have a level, 60-inch minimum landing immediately before and after a sloped run, and a landing must be installed for every 30 feet of sloped run.

◇ Handrails: Handrails are recommended for safety purposes any time an element such as a ramp or bridge is present on a path. The gripping surface of handrails should be between 1 1/4 and 1 1/2 inches wide. Recommended handrail heights for adults should be 34 to 38 inches; heights for children should be 20 to 27 inches.

◇ Obstacles: Paths should be free of any obstacles such as roots, rocks, and/or steps. There should be ample head and side clearance (i.e. from tree branches) for individuals at standing and seated levels. It is important to maintain pathways for safety.

Planting Beds and Containers

◇ Create raised planting beds or boxes to accommodate individuals who use wheelchairs, senior citizens and other individuals with limited mobility. There are a variety of styles and heights that can be used; if possible use a mixture of heights to accommodate the greatest range of individuals.

◇ Create a sensory garden (in which visitors can smell, touch and hear) in a raised bed or standing planter box for individuals with visual impairments. This allows individuals to comfortably explore and experience the plantings.

◇ Raise plants vertically with trellises to provide access to plants for a greater number of individuals.

◇ Containers are an inexpensive way to created raised plantings. Whiskey barrels and other large planters are excellent heights for wheelchair access. In addition, you can use plant stands, existing walls, etc. to place containers at different heights.

◇ If possible, use a multi-layered landscape design to increase access to all individuals.

Tools

- A variety of adaptive gardening tools are available, including long-handled tools, tools with adaptive handles, lightweight and comfort-grip tools. The handles of traditional gardening tools can be modified with tape/foam/or bandage material for gardeners with limited muscle strength, coordination or dexterity of the hands.

- Have gardeners who have difficulty carrying items wear an apron with pockets or secure a lightweight bag or basket on their wheelchair or walker.

- If possible, provide a tool storage shed in or near the habitat.

- To increase comfort, have gardeners who have difficulty bending or have joint pain use kneelers, knee pads, or a small stool.

- Use tools with brightly colored handles or paint or tape the handles white to provide contrast for gardeners with low vision.

Signage

- Interpretive signs should not be text-heavy; text should be in large, no-glare block letters. When possible, utilize pictures and/or symbols.

- Make Braille plant labels for raised bed sensory gardens.

- For larger public gardens, incorporate an auditory interpretation system into signage.

Miscellaneous

- Add benches for people to rest. Benches should have back supports and an armrest on at least one end for safety purposes. If possible, place benches in shade. Recommended spacing between benches is 100 feet or less, depending on the size of the habitat.

- Choose plants for scent and tactile recognition for gardeners and visitors with visual impairments.

- Use sound-producing elements such as wind chimes, a waterfall or a fountain to help provide orientation in the habitat for gardeners and visitors with visual impairments.

Using a Compass

Using a compass is quite simple, but it may take some getting used to. Here are a few simple directions that will work for most compasses:

1. Keep the compass flat at all times.

2. Rotate the compass so that the red pointer needle is inside the white arrow. It should point in the same direction as the white arrow. If you then face your body in the same direction the arrows are pointing, you will be facing north.

3. If you are facing north, west will be on your left, east on your right, and south directly behind you.

4. The whole circle is 360 degrees. North is at 0 degrees, east is at 90 degrees, south is 180 degrees, and west is 270 degrees.

If your students are unfamiliar with using a compass, you may want to do several preliminary activities to get them comfortable with this useful equipment.

The instructions that come with compasses often include interesting activities, and **The Basic Essentials of Map and Compass** by Cliff Jacobson (1999) is also helpful.

Container Gardening

Some schools have little or no land available for planting, generally because most of the grounds have been paved with asphalt. Sometimes schools have engaged in highly successful projects which begin with engaging community resources in tearing up part or all of their school's asphalt. If you are unable to do so at this time, you can still have success with a small site or on grounds with poor soil by creating your wildlife garden in containers. Many schools have grown thriving gardens on top of asphalt, rooftops, and paved courtyards in this way.

Container Selection

In selecting containers, you may choose the traditional clay or plastic pots available at any nursery. When buying plastic containers, avoid dark colors that will absorb sunlight, and overheat your plants' roots. Any container you plant in must have drainage holes which are large enough so that excess water can drain, but small enough so that soil is not lost through the openings.

Another option is to build your own wooden planter boxes.When selecting lumber, choose wood that naturally resists the damaging effects of water; avoid wood treated with preservatives containing pentachlorophenol. Containers holding large trees should be built so they are easy to take apart (i.e. with nuts and bolts) for periodic root maintenance.

To make containers accessible for those in wheelchairs, mount your containers on sawhorses or wooden legs. Raised beds should have 27" clearance from the ground to the bottom of the bed to be wheelchair accessible. For more information on accessible gardens, visit http://www.abta.org.

Soil and Water Basics

Drainage is very important in container gardening. Make sure your containers allow excess water to flow through, since water trapped at the bottom of the plant can harm, and eventually kill, some plants. To ensure proper drainage, buy pots with drainage holes or drill holes into your containers and planter boxes.

A mix of organic matter, vermiculite and peat moss will provide good drainage in containers. Traditional potting soil often does not hold moisture well; contact your local nursery or cooperative extension in choosing the proper mix for your plants. Leave at least two inches of space between the top of the container and the top of the soil.

The National Gardening Association's online catalog offers several containers and kits for easy-to-construct planter boxes. Visit http://www.kidsgardening.com.

If your school has limited land to use for creating a wildlife habitat and outdoor classroom, consider creating a garden on the school rooftop. Be sure to check with the maintenance facilities personnel in early discussions. Your plants will be exposed to more wind and sunlight on the roof than they would be at ground level. To compensate for this, choose hardier plant varieties. Simple structures such as wooden trellises or burlap screens can provide some wind protection and areas of shade.

To learn about the City of Chicago's efforts to reduce energy demand and improve air quality, visit: http://www.ci.chi.il.us/Environment/html/RooftopGarden.html.

Also visit the **Rooftop Gardens Resource Group**
http://www.interlog.com/~rooftop and
City Farmer's Rooftop Gardening Information Page:
http://www.cityfarmer.org/rooftop59.html

Planning Guide Feedback Form

National Wildlife Federation

To produce a more accurate, effective, and user-friendly product, we need your feedback. Please let us know what you think of this guide. Once you have completed this form, please return all comments to the address below. ***Please feel free to use separate pages to answer questions or add additional comments.*** Be as specific as possible. Thanks so much for your time and assistance!

Optional

Your Name:

Address:

Phone: Email:

General:

1. Overall, how effective is this guide in preparing educators to create a Schoolyard Habitats site ? Is there anything missing? How might we remedy this issue?

2. How useful and complete was the background and planning information? Did you identify any particular topics that could be added or expanded upon?

3. Please comment on specific activities, especially those you found especially helpful or those that were lacking. Please indicate anything that you found unclear.

4. Did you modify any of the activities? If so, how?

5. How well do the activities reflect the grade level range they have indicated? Please point out activities that need to be reassessed in this regard.

6. Is your Schoolyard Habitats site certified/Do you plan to certify your Schoolyard Habitats site? If not, why?

7. How have you used your Schoolyard Habitats site in cross-curricular learning? We are eager to hear examples!

Additional comments:

Return to:
Schoolyard Habitats Program
National Wildlife Federation
11100 Wildlife Center Drive
Reston, VA 20190-5362

Bring the WILD into your classroom!

Sign up today for a **National Wildlife Federation Educator Workshop** and learn how you can use our fresh, fun, standards-based activities in your classroom.

schoolyard habitats®
NATIONAL WILDLIFE FEDERATION®

Creating Schoolyard Habitats® (K-8, 9-12): Did you know you can teach to content standards while outside on your own schoolgrounds? Turn your schoolyard into a unique, hands-on, outdoor classroom, where you can teach math, science, literacy, art, history, civics and much more! Across the country, thousands of school communities have created certified Schoolyard Habitats projects. These habitats are part of functional local ecosystems that provide important habitat for wildlife as well as inspiration and hands-on learning opportunities for students. At NWF's special 2-day workshop, educators learn how to plan, create and certify a Schoolyard Habitats site and how to incorporate cross-curricular, standards-based activities. Learn more by visiting our website at: ***www.nwf.org/schoolyardhabitats.***

The National Wildlife Federation also offers educator workshops on:

• **Discovering Habitats (K-8)**—What's the connection between a habitat and an ecosystem? What diverse habitats can be found right in your own locale? Educators learn how to guide students through personalized conservation projects that help to answer these questions and more!

• **Endangered Species (K-8)**—What are the links between habitat loss and extinction? Educators will learn to guide students to an understanding of endangered species conservation and find out what they can do for species in their area.

• **Wetlands (K-8)**—This workshop provides hands-on activities designed to teach your students how to identify wetlands in your state, the importance of wetlands as habitats and the impact of pollution on wetland species.

NWF offers similar workshops on these specific habitats: **Prairies**, **Arctic**, **Northern Forests**, and **Water**.

Workshop Details: All workshop participants receive an NWF curriculum kit aligned with the National Standards of Learning. Most workshops are 6-8 hours long and the fee is $35 per person. The two-day Schoolyard Habitats workshop is $50 per person. Group rates are available. NWF will help your school identify and recruit additional participants from other schools within your community to make up the minimum of 20 participants per workshop.

Sign up for an NWF workshop today!

Call 1-800-822-9919
or send an email to (your state abbreviation)-ED@nwf.org
[example: VA-ED@nwf.org]

NATIONAL WILDLIFE FEDERATION®
www.nwf.org™

National Wildlife Federation
11100 Wildlife Center Drive
Reston, VA 20190-5362
1-800-822-9919
www.nwf.org

We hope this Planning Guide will engage and encourage everyone to appreciate the natural world around us and take action to help conserve it.

Credits

Vice President, Education:	James L. Stofan
Sr. Director, Education Publications:	Donna Johnson
Sr. Director of Circulation Marketing	Patty Key
Sr. Director of Production	Laura Hickey
Director of Community Programs	Heather Carskaddan
Director of Classroom and Electronic Education	Bill Street
Sr. Manager, Educator Programs:	Stephanie Stowell
Chief Naturalist:	Craig Tufts
Schoolyard Habitats Program Coordinator:	Stacy Carr
Schoolyard Habitats Training Coordinator:	Tracie Beasley
Curriculum Specialist:	Sharon Katz Cooper
Access Nature Senior Coordinator/ Inclusion Specialist:	Bethe Gilbert Almeras
Illustrators:	Jennifer DiRubbio Patricia Wynne Ted Walke/Within Reach
Design:	Stetson Turner Design

NWF Executive Staff:

President and CEO:	Mark Van Putten
General Counsel:	Eileen Morgan Johnson
Sr. Vice President & CFO:	Lawrence J. Amon
Sr. Vice President, Conservation Programs:	Jamie Rappaport Clark
Sr. Vice President, Constituent Programs:	Natalie S. Waugh
Staff Director:	Wayne Schmidt

NWF Vice Presidents:
Dan Chu, Robert S. Ertter, Carole S. Fox, John H. Giesecke, Philip B. Kavits, Jaime Berman Matyas, Thomas F. McGuire, Susan Rieff, James L. Stofan, Carolyn Waldron

Senior Advisors:
Barbara J. Bramble, Tom Dougherty, Douglas B. Inkley

A special thanks to the Wege Foundation for their generous support of the Schoolyard Habitats® Program

SE067002

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: Schoolyard Habitats Planning Guide	
Author(s): National Wildlife Federation	
Corporate Source:	Publication Date: 2001

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

Level 1

Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) and paper copy.

The sample sticker shown below will be affixed to all Level 2A documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2A

Level 2A

Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only

The sample sticker shown below will be affixed to all Level 2B documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

Level 2B

Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Signature: Stephanie Stowell	Printed Name/Position/Title: Sr. Manager, Educator Programs	
Organization/Address: National Wildlife Federation 11100 Wildlife Center Drive Reston, VA 20190	Telephone: 703.438.6545	FAX: 703.438.6408
	E-Mail Address: stowell@nwf.org	Date: 11/6/02

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC, or, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:
Address:
Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:
Address:

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to:

ERIC Processing and Reference Facility
4483-A Forbes Boulevard
Lanham, Maryland 20706

Telephone: 301-552-4200
Toll Free: 800-799-3742
FAX: 301-552-4700
e-mail: info@ericfac.piccard.csc.com
WWW: http://ericfacility.org